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1917.
(SECOND SESSION.)

LEGISLATIVE ASSEMBLY.
NEW SOUTH WALES.

REPORT

OF THE

DIRECTOR-GENERAL OF PUBLIC HEALTH,

NEW SOUTH WALES,

FOR THE YEAR ENDED 31ST DECEMBER,

1916.

Ordered by the Legislative Assembly to be printed, 26 October, 1917.



SYDNEY : WILLIAM APPIEGATE GULLICK, GOVERNMENT PRINTER.

1918.
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**Offices of the Director-General of Public Health, 93 Macquarie-
street, Sydney.**

Branches and Institutions controlled by the Director-General of Public Health :—

Executive and Clerical Staffs.
Epidemic and Sanitary Inspectorial Branches.
Microbiological Laboratory.
Chemical Laboratory.
Pure Food Branch.
Dairies Supervision and Cattle Slaughtering Branches.
Hospital Admission Dépôt, and Ambulance Service and Disinfecting Station
Woolloomooloo Bay.

State Hospitals and Asylums, Convalescent Homes, and Sanatoria, including :—

Coast Hospital for General and Infectious Cases.
Leper Lazaret.
David Berry (General) Hospital.
Lady Edeline Hospital for Babies, "Greycliffe," Vaucluse.
Strickland Convalescent Home for Women, "Carrara," Rose Bay.
Denistone Convalescent Home for Men, Eastwood.
Waterfall Sanatorium for Consumptives.
Rookwood State Hospital and Asylum (Men).
Liverpool State Hospital and Asylum (Men).
Newington State Hospital and Asylum (Women).

Parramatta Homes :—

- (a) Macquarie-street Asylum for the Blind, and for Men suffering from defective sight and senility.
(b) George-street Asylum for Aged and Infirm Men.

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Board of Health.

Paton, Robert Thomson, M.D., Brux.	...	Director-General of Public Health
Fosbery, The Hon. Edmund Walcot, C.M.G., M.L.C.		Member, Board of Health.
Mackellar, The Hon. Sir Charles Kinnaird, K.C.M.G., M.B., C.M.	Do	do
Stuart, Sir Thomas Peter Anderson, Kt., M.D.	Do	do
Robinson, Augustus Frederick	...	Do
Foreman, Joseph, M.R.C.S. (Eng.)	...	Do
Purser, Cecil, M.B., Ch.M.	...	Do
Chairman, Chamber of Commerce (G. A. Parkes, Esq.)—Succeeded in August by A. A. C. Cocks, Esq.	Do	do (<i>ex officio</i>)
The Rt. Hon. the Lord Mayor (R. D. Meagher)	Do	do (<i>ex officio</i>).
Flynn, Emanuel John	...	Do

Head Office Staff.

Paton, Robert Thomson, M.D., Brux.	Director-General of Public Health.
Armstrong, William George, M.B., D.P.H.	Deputy Director-General of Public Health.
Chapple, Alexander Tennant, M.B., Ch.M.	Assistant Medical Officer.
Palmer, Arthur Aubrey, M.B., Ch.M.	First Government Medical Officer for Sydney.
Cahill, Arthur Charles, M.B....	... Second do do
Neely, Thomas Henry	... Secretary.
Potter, James Julius	... Chief Clerk.
Thornthwaite, Ernest John	... Accountant.
Lake, Alfred	... Inspector of State Hospitals and Asylums.
Tompkins, Henry James	... First Clerk.
Ranshaw, John James	... Clerk.
Creagh, Stephen Thomas	... Do
Alexander, Cecil Eustace	... Do
Boyle, John James Valentine	... Do (on Active Service).
Carroll, Frederick Launcelot	... Do
Willcock, Mabel	... Shorthand-writer and Typiste.
Sparks, Lessie Florence	... Do do
Pattle, Jessie Ethel	... Do do
Thomson, Gladys May	... Do do
Cooke, J. C.	... Clerk.
Cohen, S.	... Do
Wales, T. J.	... Do
Carrick, Herbert Thomas James	... Do
Butler, F. N.	... Do
Watt, C. J.	... Do
Curran, E. C.	... Do
Goodwin, E. J.	... Do
Heyward, Daniel Frazer	... Attendant.
Mace, Charles J.	... Messenger.
Logan, Norman	... Do
Skerritt, Ralph S.	... Do
McElhinney, James	... Night Officer.

REPORT of the Director-General of Public Health to the Honorable the Minister of Public Health.

SIR,

I have the honor to present herewith my Report for the year 1916.

Year by year the need for the amendment and consolidation of the Public Health Act of New South Wales becomes more and more evident. In common with all the other States of Australia, the Public Health Act of this State is framed more or less closely upon the model of the English Public Health Act of 1875, with modifications in several directions to meet the special needs of this country. Many provisions for the control and safeguarding of the public health are, however, to be found in other legislative enactments than the Public Health Act, as for instance the Local Government Act, Dairies Supervision Act, Noxious Trades Act, Cattle Slaughtering Act, &c. The dissemination of legal provisions for the safeguarding of the public health in so many different acts constitutes a weakness in administration. Comparing the public health legislation of the different States of Australia it will be found that that of New South Wales is on the whole the most conservative, even antiquated in type, and the most cumbrous to administer. This latter fact is due largely to the want of concentration just referred to. As an instance may be quoted the extensive public health regulating powers contained in the Local Government Act. This Act is not within the direct administration of this Department, and desirable supervision over the very valuable public health provisions of that Act can only be exercised by a roundabout and difficult process; more direct administrative authority by this Department is therefore essential.

Directions in which such control is urgently needed are the supervision of the appointment by Local Authorities of their sanitary inspectors. The Local Government Act, it is true, gives the Board of Health the power to require local authorities to appoint a sanitary inspector if they have not already such an officer, but this provision can be easily evaded by a mere nominal appointment on the part of local authorities. The Department of Public Health has no power to enforce the appointment of a competent officer for this important work.

Another direction in which important powers are lacking to the health authorities of this State is that of making regulations, particularly regulations for the control of infectious persons. Many of the other States of Australia are far ahead of New South Wales in this particular. In Victoria and Queensland the Public Health Department can make regulations for the effective control of "carriers" of infectious disease. One of the recent developments of sanitary science has been the discovery that certain persons, though not themselves suffering from any symptoms of an infectious disease, may nevertheless carry the germs of such a disease on or in their persons, and may infect other persons with whom they come in contact with the disease in a virulent form. Such individuals unless they are kept under some sort of control may become very dangerous to the public.

There are other directions in which amendments of the Public Health Acts are urgently needed, and above all is essential the consolidation of all legislation dealing with the public health into one comprehensive Act. Any amendment introduced should aim at conserving and extending the elasticity of control of the public health by granting powers to the Board of Health to make regulations, rather than by the introduction of hard and fast legislative provisions.

SANITARY CONDITION OF HOTELS.

A special inspection was made of the sanitary condition of hotels. The chief defects disclosed were those relating to deficient lighting and ventilation of rooms; and, in the more out-lying suburbs, unsuitable drainage systems. On service of notices these defects were in most instances promptly remedied by the licensee without the Department having recourse to further action.

CHEMICAL LABORATORY.

On p. 18 will be found the report of the Government Analyst (Dr. Thomas Cooksey). The work undertaken by the Branch under his control during the year comprised the testing of some 11,000 samples, consisting of milk and other foods taken under the Pure Food Act; food supplied to troopships; materials tested for the Stores Supply Department and other services, and medico-legal examinations conducted for the Police and Justice Departments.

There was an increase on last year's figures of all samples except milk. A notable example of this increase is shown in the number of samples of food taken from troopships, which amounted to 630, or more than double the number submitted in 1915. The value of the systematic inspection of food supplied to the transports is evidenced by the decided improvement in its quality, as the number of samples failing to comply with the requirements of the Pure Food Act fell from 20 per cent. in 1915 to just under 11 per cent. this year.

Several samples of drinks and cordials prepared and sold in country towns were found to be dirty and unfit for human consumption, owing largely to the lack of proper filtering apparatus. Owing to the Department's continued activities for the suppression of nostrums and "quack medicines," several prosecutions were undertaken against vendors of much-advertised "fat producers" and "flesh reducers"; the proprietors of an appendicitis mixture consisting of cream of tartar, carbonate of soda, and tartaric acid; and a worthless cancer "cure" advertised and sold at 15s. per bottle. All of these so-called "cures" were the subject of careful analysis to ascertain their curative value, if any.

DAIRIES SUPERVISION ACT.

The Milk Supply is a subject which receives special attention from this office. Oversight of this very important food is secured under the Dairies Supervision Act, 1901, and by certain clauses of the Pure Food Act, 1908. Supervision of the milk supply begins at the dairy farm, where proper provision must be made for collecting and storing, and it is under control from that time until it reaches the consumer. Administration of the Dairies Supervision Act is vested in the local authority of each district—in the municipalities this is the Council; in places where there is no municipality, the senior police officer of the police district. These duties consist of keeping a register of all dairymen and milk-vendors, and inspecting each premises together with appliances and utensils at least four times a year. The Board of Health has its own dairy inspectors, consisting of a field staff of fourteen in the country, and one in the metropolitan area, who supervise as far as possible the work of the various local authorities. On account of the small staff employed it is not possible to compass this work in so complete a manner as the Department would wish. Any diseased animals discovered are destroyed under supervision. An account of the work of this branch will be found in the report of the Acting Chief Veterinary Inspector (Mr. R. C. Bell) on p. 33.

Milk in transit to market is also kept under supervision, the Department insisting upon the absolute cleanliness of all milk receptacles of every description used by dairymen and milk vendors.

Upwards

Upwards of 10,000 samples of milk are taken annually for analysis by the officers authorised under the Pure Food Act, from milk vendors in metropolitan and county districts. In 1916 the number of adulterated milks was 516 out of a total of 8,493 samples examined. A number of samples referred to were taken in restaurants and refreshment rooms from the milk jugs served with tea and other beverages, and in a large number of instances this milk was found adulterated, in some cases the amount of added water being as high as 24 per cent. Proceedings taken resulted in fines ranging from £5 to £12 being imposed.

Milk Standard: In dealing with milk there is another aspect which is of almost as great importance to the public as its purity, namely, its value as a food. For a number of years the Health Department has insisted that the fat content of milk shall not be less than 3·2 per cent. Attempts have been made from time to time by certain sections of those interested in the milk trade to have this standard lowered, and pressure has been brought to bear with that object in view. The Department, however, has consistently maintained that 3·2 per cent. is not too high a standard. Its attitude in this respect is now being appreciated by many of those who formerly were most persistent in their efforts to secure acceptance of a lower fat content, as milk companies are paying higher prices for a richer article. Had the Department yielded to pressure and allowed the standard to be lowered, the only effect would have been to offer a premium to dairy farmers who kept herds producing a greater quantity of milk of a less nutritive character.

The Dairy Industry Act, 1915, administered by the Department of Agriculture dealing with the manufacture, sale, storage, transit, and export of dairy produce was in operation during the year 1916, and the administration by two separate Departments has to some extent given rise to complaints in regard to overlapping of inspection by two different sets of officers. The advisability of arriving at some means by which this dual control can be obviated is too apparent to need comment, and an effort should be made so that those engaged in the dairy industry shall not be subjected to unnecessary expenditure as to which department's instructions shall be complied with in cases of doubt.

Meat inspection in country districts: The inspection of meat in the Metropolitan and Hunter River Districts is now controlled by specially appointed Boards. Outside these areas the Department continues its supervision over all meat slaughtered for food.

PURE FOOD ACT.

A bulky volume would be needed to adequately describe the improvements secured by the Department in connection with food supplies in this State since the Pure Food Act came into operation in July, 1909. Inspectors at first directed attention to the gross adulteration of the more common foods which then existed. The revised code of regulations fixing legal standards for every article in general use came into force on 1st January, 1916, and is proving satisfactory. In the code referred to the Pure Food Committee endeavoured, as far as possible, to follow on the lines laid down by the interstate conference held in Melbourne in 1913.

PREMISES USED FOR PREPARING FOOD.

Since the passing of the Act a systematic inspection has been made of all premises used in connection with the preparation of food, and the clean and wholesome conditions now almost everywhere existing are a welcome evidence of progress when comparison is made with the laxly kept premises and insanitary conditions so frequently found six or seven years ago.

Bakeries.

Bakeries : As will be seen from the report of the Chief Food Inspector (Mr. Arthur Kench, p. 22) all premises used for the preparation of bread and pastry were carefully inspected with beneficial results.

Manufacturing Confectioners : The premises used for the manufacture of sweets, &c., have received detailed inspection. In a few instances the whole interior of the building, including walls, benches, floors, and utensils were in a dirty condition, and in several cases it was found necessary to take proceedings for insanitary conditions. Attention was also given to the fruit products used at these premises, and on several occasions traders were found using damaged and deteriorated fruits for trade purposes, evidencing the need for the strictest supervision being maintained.

Jam Manufacturies were another class of premises which were systematically examined. Here also in a few instances very unsatisfactory conditions were found to exist, some of the largest traders being guilty of wilful neglect, not only in connection with the general condition of the premises, but also in regard to deteriorated food products stored thereon. Prosecutions taken resulted in the imposition of fines ranging from £5 to £30.

Fish and Small Goods Shops : The sanitary conditions of these premises were examined and structural alterations made where necessary. In all cases where wilful neglect was apparent or dirty or insanitary conditions found, traders were prosecuted, and fined in sums ranging from £5 to £10.

Fruit Barrowmen : Attention has been given to the exposure of fruit on barrows and elsewhere in the public streets, and in some instances barrowmen have been prosecuted for selling fruit unfit for human consumption. In the more flagrant cases the whole of their stock was seized and destroyed. It was occasionally found that dirty rags were used for the purpose of polishing fruit, and in one instance a trader was fined £2 and 6s. costs for using a soiled handkerchief for the purpose. Action is also being taken to stop the practice of "topping-up" fruit, and then selling an inferior article.

This branch initiated and energetically proceeded with the work of endeavouring to secure the removal from the market of all falsely described remedies and "cure-alls," several prosecutions being undertaken during the year.

PUBLIC HEALTH AND SANITARY ADMINISTRATION.

All matters connected with sanitation are immediately under the jurisdiction of the Deputy Director-General of Public Health (Dr. W. G. Armstrong), who is furnished with a staff consisting of a Chief Sanitary Inspector and trained inspectors.

From the report of the Chief Sanitary Inspector (Mr. E. A. Cresswick), p. 35, it will be noted that the amended Public Health Act has proved of great benefit in dealing with houses unfit for human habitation. The provisions of the amended Act have been availed of by many of the suburban and country municipal councils, and very little friction has resulted from their enforcement.

Nuisances : A frequent cause of complaint is of nuisances arising from stables or from the keeping of poultry. It is hoped before long that legislation will be introduced which will provide effective means for suppressing or effectively supervising these and similar nuisances.

Rats : Many complaints were made also by residents in the Metropolitan district of nuisance caused by rats, and the attention of councils was invited to the provisions of Local Government Ordinance No. 39, which requires that the floors of produce stores, &c., shall be
impervious

impervious to rats, and fixes penalties for allowing refuse or waste matter likely to encourage rats to visit or frequent premises, or to form or afford shelter or harborage for them; and councils were requested to take early measures to cope with the trouble.

Pollution of Ocean Beaches.—The firm action taken by the Department has resulted in a great diminution in the former pollution of beaches by garbage discharged from punts and sea-going vessels. Punts conveying garbage from the city are required to go at least five miles out to sea before dumping their cargoes, and all garbage so dumped must be of a sinkable nature. Restrictions of this kind do not exist in regard to ocean-going vessels, and the Commonwealth authorities, whose jurisdiction extends three miles from the coast line, were requested to take measures to put an end to the practice followed by such vessels of discharging their refuse as soon as they cleared the Sydney Heads, thereby contributing largely to the pollution of the local beaches.

Inspection of Country Towns.—This staff has made systematic progress with such inspections during the year.

Garbage Tips and Destructors.—As a result of notices served and action taken by the Department, considerable activity has been exhibited by various suburban municipalities in an attempt to deal with garbage in a more satisfactory manner, and destructors have now been provided by Marrickville, Woollahra, and Paddington Councils. Several other councils have the question under consideration. In view of the financial position which exists at the present time, it would be advisable in many cases for two or three councils to combine and conjointly erect a modern destructor. This course was adopted many years ago by Petersham, Leichhardt and Annandale Councils, and has worked very satisfactorily. It has the great advantage of providing an efficient and economical service at a comparatively small cost to each of the councils concerned.

In general it can very truly be said that there has been a very great improvement in suburban garbage tips as compared with the conditions found existing when a systematic inspection was made in June, 1915, but strict supervision is still required in certain localities if gross nuisance is to be avoided.

Laundries.—During the year an examination was made by the Chief Sanitary Inspector of large and small laundry premises in the metropolitan district, and of the methods employed in sorting and disinfecting soiled clothing. Certain recommendations made in connection therewith are receiving attention.

Summary of Quarterly Reports.—On p. 62 will be found a summary of quarterly returns received from local authorities throughout the State, showing the action taken by them under the Public Health Act, 1902, and Governor's regulations thereunder.

PRIVATE HOSPITALS ACT, 1908.

The report of Dr. A. T. Chapple, the medical officer dealing with the Private Hospitals Act, will be found on p. 39. The year 1916 has shown several additions to the private hospitals already in existence. During the year several large premises situated in the metropolitan area have been entirely remodelled and fitted with every convenience, the results being very satisfactory. The increase in the number of cases of scarlet fever, measles, diphtheria, and infantile paralysis, again emphasised the need for establishment of private hospitals for well-to-do patients suffering from infectious illnesses. For lack of such accommodation persons residing at hotels or boarding-houses have frequently to be provided for at the Coast Hospital at great inconvenience to the Department, already overtaxed in finding beds for needy patients.

INFECTIOUS

INFECTIOUS DISEASES.

A statement of the infectious diseases notifiable in New South Wales, and tables showing their incidence during the year ended 31st December, 1916, appear on pp. 51-60.

Typhoid Fever.—The behaviour of typhoid fever during the year was in marked contrast to that of diphtheria. There has been less typhoid fever in this State during 1916 than at any time during the last twenty years—year by year for some time this disease has been on the decline. This is highly satisfactory, as typhoid fever is one of the most serious of the common infectious diseases, and has in the past cost the State large numbers of valuable lives. This reduction is the outcome of the Department's insistence on local authorities enforcing effective sanitary measures in their districts, such as efficient sanitary and garbage services, cleanliness of dwellings and yards, properly protected water supplies, &c., and particularly by the increased vigilance in connection with the supervision of dairies and the milk supply generally. In many country towns where formerly there was a severe outbreak every summer, only three or four cases are now reported in the course of the year.

In this connection may be mentioned the report on typhoid fever issued in May, 1916, by the committee appointed to inquire concerning "Causes of Death and Invalidity in the Commonwealth," which concludes that the great and steady diminution in the typhoid mortality rate in the last thirty years is due to measures of sanitation, the principal factor probably being controlled disposal of human excreta. The committee, in pointing out that there still remains considerable typhoid mortality in the Commonwealth, particularly directs attention to the high rates in country districts as compared with the capital cities, and expresses the opinion that "the continuing loss of valuable lives every year from this disease is probably largely due to defective or incomplete application of recognised principles of sanitation; or to direct or indirect infection by infective humans (cases or carriers) probably largely by means of personal neglect of cleanliness, and by food infection."

Typhoid Fever at Broken Hill.—This year again there were a number of cases in this city, which has been notorious as a hot-bed of the disease for a number of years. The Department, both two years ago and again this year, offered the citizens of Broken Hill free inoculation against typhoid fever, but the offer was not taken advantage of. In another country town, Forbes, which has been badly affected with typhoid fever for several years, anti-typhoid inoculation has had a satisfactory result, the number of cases reported this year and in 1915 from Forbes having shown a considerable decrease.

In the metropolis an extensive outbreak of typhoid fever which occurred at Alexandria appeared to be chiefly due to total lack of sanitary precautions on the part of certain householders. Another outbreak occurred at Botany, and an investigation made by the Acting Medical Officer of Health (Dr. F. M. Suckling), p. 75, points to the infection of the fifty-two cases which comprised the outbreak being due to a typhoid "carrier" case at a dairy in that district.

Diphtheria.—The incidence of diphtheria, which has been increasing steadily in New South Wales for eight years, was again higher than ever, and the number of cases notified, namely 6,588, was greater than that of any previous year. Towards the close of the year there was some indication that the epidemic had begun to decline.

The disease was prevalent throughout the metropolis. In the country, the districts most affected were Adjungbilly Shire, 58; Albury, 40; Bathurst, 59; Boree Shire, 49; Broken Hill, 505; Casino, 44; Cessnock Shire, 37; Crookwell Shire, 50; Gadara Shire, 57; Goulburn, 72; Inverell,

Inverell, 90; Junece, 45; Orange, 42; Tamworth, 43; Wentworth, 37. It should be noted, however, that diphtheria is not one of those diseases which depends for its spread upon the prevalence of insanitary conditions. Like scarlet fever, it is a disease the infection of which is disseminated by personal contact. The infective germ of diphtheria may be carried in the throat of an individual who is not himself suffering in any way, but who is nevertheless liable to spread the infection.

Infantile Paralysis.—Quite a disturbing little outbreak of infantile paralysis occurred during the summer months—294 cases were notified, of which 181 were in the metropolis. This disease is a seasonal one, and affects people during the summer months, in opposition to cerebro-spinal meningitis, which is chiefly a winter disease. Although the prevalence of the disease reached alarming proportions during one part of the summer, the outbreak never approached the intensity to which it attained in New Zealand, where, with a little above half the population of New South Wales, the authorities had to deal with over 1,000 cases.

During the epidemic a rumour caused many persons to think that infantile paralysis was a disease associated with the seaside. In order to establish the fallacy of such a belief, special investigations were undertaken by the Medical Officer of Health. These fully demonstrated how erroneous the supposition was.

Cerebro-spinal Meningitis.—The outbreak which began in 1915 continued during the current year, but with less severity than in the preceding year. To a great extent it was confined to those districts in the immediate vicinity of military camps; and in several instances in which outbreaks occurred in districts remote from such camps, infection was traced to soldiers who had visited the district a few days before. This is another of those diseases in which “carriers” are more numerous than persons actually suffering from the disease, and are probably in many instances the source from which infection is derived. During 1915 and 1916 outbreaks of cerebro-spinal meningitis were common all over the civilised world, and New South Wales was not exceptional. The other Australian States also suffered considerably.

GOVERNMENT MEDICAL OFFICERS FOR SYDNEY.

The report of the first Government Medical Officer for Sydney (Dr. A. A. Palmer) will be found on page 61.

Drs. Palmer and Cahill, in addition to the other duties mentioned, examine all candidates for admission to the Public Service and the Police Force, and all applicants for exemptions or permits under the Factories Acts.

One of the most onerous of the duties pertaining to Dr. Palmer's office is in relation to medico-legal work. All criminal cases in which medical evidence is necessary are dealt with by him before being referred to the Government Analyst, the Microbiological Laboratory, or elsewhere, if further expert evidence is necessary.

A very considerable amount of work is also done for the City Coroner by this officer. During the year 230 post-mortem examinations of bodies were made, and evidence was given at the Central Criminal Court in relation to 3 deaths, and at the Coroner's Court in connection with 48 deaths.

A very great amount of work is carried out under the supervision of these officers in connection with the sick poor of the Metropolitan district. At the Hospital Admission Dépôt, over 12,000 persons were medically examined during the year before admission to one or other of the metropolitan hospitals or asylums.

MEDICAL

MEDICAL OFFICERS OF HEALTH.

The reports of the Acting Medical Officers of Health for the Metropolitan and Hunter River Combined Districts (Drs. F. M. Suckling and Booth-Clarkson) will be found in Part II of the Report (pp. 68 and 82). The permanent officers attached to these districts (Drs. J. S. Purdy and Robert Dick, respectively) are still on Active Service, and reports received indicate that they are engaged in important hospital duties in France.

Metropolitan Combined District.—From Dr. Suckling's report it will be seen that the health conditions of the metropolis for the year were satisfactory, the death-rate, 10·24 per 1,000 of the population, being below the average of the preceding five years—all years of low mortality.

Septic Tanks.—As in previous years a considerable amount of work was entailed on the Medical Officer of Health in inspecting sites and examining plans in connection with septic tank installations in suburban unsewered areas.

Hunter River Combined District.—Dr. Booth-Clarkson directs attention in his report to the neglect of their duties by certain Local Authorities in the Hunter River Combined District, the tendency being to leave the bulk of public health work to departmental officers. Among instances cited are the important City of Newcastle, which took no action whatever during the year under the Pure Food Act; of the seventeen municipalities and five shires included in this district, milk samples were only taken and submitted for analysis by Hamilton and Merewether municipalities and Lake Macquarie Shire.

Dr. Booth-Clarkson directs attention to the high mortality rate for infants under the age of one year; the death-rate being 81·5 for the Hunter River District, as compared with 67·84 for the remainder of the State. A Baby Clinic has been opened in one portion of the district, but no statistics are yet available to show what effect it has had in reducing infantile mortality in the neighbourhood.

Another matter of importance referred to in the report is the opening of the Newcastle District Abattoir in June, and the abolition of all other slaughtering premises within a radius of 14 miles of the Newcastle Post Office.

Clinics.—Dr. Booth-Clarkson recommends that a clinic for venereal diseases should be opened at Newcastle; also that the Throat and Chest Dispensary should open in the evening as soon as war conditions permit.

Broken Hill and District.—In his report (p. 102) the part-time Medical Officer for this district (Dr. J. F. Bartley) refers to the high death rate of infants under twelve months old, equal to 96·3 per 1,000 births, and says that gastro-intestinal diseases and prematurity are the chief causes; the former he attributes to the great difficulty in procuring a satisfactory milk supply during the summer months.

Proposed extension of Combined Health Districts.—It is the intention, as soon as medical officers and nurses are available and financial conditions permit, to divide the State into Public Health Districts, and to place a Medical Officer of Health, with a competent sanitary staff, in charge of each division.

SMALLPOX.

The report of the Deputy Director-General of Public Health (Dr. W. G. Armstrong) forms Part III of this Report (p. 108). For the fourth year consecutively smallpox continued in New South Wales, but the epidemic showed evident signs of disappearance. No cases occurred in the metropolitan district after the middle of the year, and from 19th September there was a complete cessation of cases, the indications being that the epidemic was at an end. However, early in
December.

December, a case was notified from Coonamble, and there is reason to believe that the disease had been lurking in the district known as the "Pilliga Scrub." The characteristics of the malady continued to conform to the mild type experienced from its first appearance in 1913. No deaths were recorded.

During the year several prosecutions were found necessary owing to neglect on the part of patients or their friends to notify that they were suffering from smallpox, or owing to careless exposure in public places of persons who were suffering from the disease. In four instances heavy penalties were inflicted by the magistrates.

One hundred and seven cases of smallpox were recorded for the year. The decline of the epidemic in this State was signalised on 14th January, by the discontinuance of the medical inspection of Sydney passengers in the neighbouring State of Victoria; and all quarantine restrictions against Sydney were lifted in Samoa and Fiji on 2nd November.

Since the beginning of the outbreak in July, 1913, there have been 2,279 cases, namely :—

1913 (July to 31st December)	...	...	1,073
1914	...	...	628
1915	...	...	471
1916	...	...	107
Total			2,279

Throughout, the disease has continued to be the very mild type of smallpox introduced from Canada in 1913. It has proved itself to be no more deadly than chickenpox, and its behaviour during a period of nearly four years makes it tolerably clear that no increase of virulence need be anticipated.

THE COAST HOSPITAL.

The report of the Acting Medical Superintendent (Dr. D. Wallace) appears on p. 112.

During 1916 the daily average number of occupied beds at the Coast Hospital showed a slight increase compared with the preceding year. In 1915 the daily average number of occupied beds in all divisions was 461 against 472 this year—an increase of 11.

The New Coast Hospital Buildings.—The three commodious and suitably equipped units of the New Coast Hospital were completed and furnished throughout, and were ready for occupation early in 1917. When these wards are in use the accommodation in the General Division will be increased by 84 beds.

The New (Infectious) Military Hospital.—The New Military Hospital, which consists of four wards equipped with twenty-five beds each and necessary nurses' quarters, was nearing completion at the end of 1916. These buildings are for the treatment of members of the Military Forces suffering from infectious diseases, such as scarlet fever and diphtheria. The military hospital on completion will be conducted by the Coast Hospital Staff, the Commonwealth Government defraying the cost of erection and equipment of the buildings together with the cost of the maintenance of such cases as may be admitted from the Military Forces.

General Improvements, &c.—Other improvements comprise the renovation of all old buildings; improvement of the lawns and gardens, and the placing under cultivation of a considerable area of scrub land.

The

The peat soil swamps proved very suitable for the production of green vegetables, some 4 acres having been drained and placed under cultivation, and yielded about 32,000 lb. of green vegetables.

LEPROSY IN NEW SOUTH WALES.

The Leper Lazaret is under the supervision of the Acting Medical Superintendent of the Coast Hospital, who in the Twenty-sixth Annual Report on Leprosy in New South Wales, p. 127, supplies data respecting all cases reported since the Lazaret was opened, and furnishes clinical notes respecting the five cases (four Europeans and one Chinese), admitted during 1916.

DAVID BERRY HOSPITAL.

The David Berry Hospital (p. 136) is in a different category to other country hospitals, as it is entirely under Government control. During 1916, 194 patients were treated at this very up-to-date and well appointed institution, which has proved a boon to residents of Berry, Shoalhaven, and adjacent districts.

A great amount of operative work was necessary during the year, the number of operations being 114 as compared with 72 in 1915.

It cannot be too often emphasised that there should be a maternity ward attached to every country hospital, and I hope that financial circumstances will permit at an early date of suitable accommodation of this nature being provided at the David Berry Hospital.

LADY EDELINE HOSPITAL FOR BABIES. (See p. 142.)

During 1916 very good work in saving babies was done by the Lady Edeline Hospital; 241 babies were treated, of whom 181 were discharged cured. The highest number in hospital—43—was in January, when there was an epidemic of gastro-enteritis of a very severe type.

In the summer of 1916, up to the end of December, there was very little gastro-enteritis as compared with the same period of 1915. This may be the result of the establishment of baby clinics in eleven of the more congested of the metropolitan districts. Nurses from these clinics constantly visit mothers, and impress upon them the importance of careful feeding and scrupulous cleanliness in rearing their babies.

By means of these district clinics the matron of the Lady Edeline Hospital is able to keep in touch with babies after their discharge from hospital. Many of the babies admitted to the hospital are sent in through the baby clinics, particularly cases of gastro-enteritis, bronchitis, pneumonia, and malnutrition.

CONVALESCENT HOSPITALS.

The Convalescent Homes ("Denistone House," Eastwood, for men, and "Carrara," Rose Bay, for women) have again proved their great value by relieving congestion at the metropolitan hospitals. Over 1,000 patients have been admitted to these homes since they were established in 1914. The majority of the patients are received from the acute medical and surgical wards of the metropolitan hospitals. Occasionally subacute and chronic cases are admitted for short periods. In all cases the patients are greatly benefited by their residence at these hospitals, which is usually about four weeks, extensions being made for exceptional cases. Persons suffering from infectious or incurable diseases are not eligible for admission, as the Homes are intended for patients convalescent from serious illness, or for those persons whose health has been seriously impaired or weakened, and who are likely to be benefited by rest and change.

PULMONARY

PULMONARY TUBERCULOSIS.

As mentioned in my report for 1915, tuberculosis was proclaimed a notifiable disease in the Metropolitan and the Hunter River Combined Districts, from August of that year, and Regulations were issued for its control there. These districts embrace the two largest centres of population in the State, and include the greater number of consumptives. The object in confining notification to these areas was to ascertain in the first instance how the Act and Regulations operated, as the wish was to avoid inflicting hardships upon those members of the community who had been so unfortunate as to contract the disease. As a result of the experience gained, operation of the Act was extended to the Blue Mountain Shire and Katoomba Municipality from 2nd October, 1916, as these districts are the resort of a large number of consumptive persons. So far no complaints have been received of any harshness caused in the administration of the Act, and considerable progress has been made in safeguarding the public from the likelihood of acquiring infection. When conditions become more settled it is proposed to extend the provisions of the Act to the whole State.

The hospital accommodation for consumptives in Government and subsidised institutions is not sufficient, and 100 additional male beds at Waterfall and a hospital of 300 beds at Little Bay for advanced cases it is hoped will be provided as matters of urgency as soon as possible. This additional accommodation will enable systematic distribution of patients to be undertaken.

It is proposed to establish a central bureau under this Department, which would either see or would have medical evidence before it in regard to all notified cases of consumption. It could then arrange for treatment of the more advanced cases in one institution, whilst other less advanced cases holding out more hope of complete cure could be accommodated in sanatoria elsewhere. Patients well on the road to recovery could be occupied outside of institutions in selected districts where the conditions appeared to be such as would expedite their restoration to normal health.

This classification of cases is a matter of very great importance, for, as emphasised by Dr. H. W. Palmer in his report on Waterfall Sanatorium (p. 146), the gradual collection there of a large number of advanced cases prevents the institution from carrying out its true functions, namely, the providing of early care and attention for patients who under such conditions have a prospect of more or less complete recovery. He again points out that hopeful cases cannot be satisfactorily or economically treated alongside dying patients, and that as the latter become more numerous (two to one at the end of 1916) favourable sanatorium conditions become more and more impossible.

In fighting consumption the principal weapons are: First, education of the public to the dangers of the disease, and the necessity for personal hygiene. Secondly, compulsory notification and registration of all cases of tuberculosis to permit of surveillance in order that the danger of spread of infection by them may be reduced to a minimum. Thirdly, provision in suitable localities of sanatoria for the treatment of early cases or recovering cases of the disease. Fourthly, provision for the chronic incurable cases in special hospitals near the city, where they can be frequently visited by their relatives and friends.

STATE HOSPITALS AND ASYLUMS.

The reports of the Officers in charge of the State Hospitals and Asylums at Rookwood, Liverpool, Newington, and Parramatta are contained in pp. 149-163. At the end of 1916 there was an inmate population of 3,268. Speaking generally the numbers were lower in

1916 than they have been for a considerable time, and occasionally there was difficulty in finding sufficient suitable inmate labour to carry out necessary work upon which such labour is usually employed.

The policy of the Department is to make the institutions as self-contained as possible, and inmates who are sufficiently well are encouraged to assist in the farm operations and in the workshops, for which they receive a small daily allowance. Dairy-farming, pig-raising, vegetable growing and poultry keeping comprise the larger outdoor activities; and in this connection considerable advances have been made during the last twelve months. At Liverpool from profits arising from the piggery 100 acres of good farming land has recently been purchased, part of which will be devoted to dairy purposes, and the remainder to the raising of vegetables and other farm produce. At Newington a considerable area of swamp land has recently been reclaimed by the Harbour Trust, which will allow of considerable extension of the farming and dairying operations.

Indoor activities at the Institutions comprise making of bread, boots and clothes; as well as a great deal of carpentry, painting, plumbing, and other general repair work.

Improvement in the Working Conditions of Employees.—In my last report I referred to a conference that was convened by the Public Service Board to consider the working conditions, salaries, &c., of employees under control of the Inspector General of the Insane and of this Department. The conference concluded its sittings in September, 1916, and as a result a new set of Regulations dealing with the employees was published. These Regulations have materially improved the conditions of the employees in regard to hours, emoluments, &c., and will no doubt tend to promote the efficiency of the staffs concerned.

MICROBIOLOGICAL LABORATORY.

In Part V will be found the comprehensive report of the Principal Microbiologist (Dr. J. B. Cleland) on the work of the Microbiological Laboratory for 1916. The total examinations conducted were nearly 10,000, as compared with under 9,000 last year. Over 2,500 swabbings were examined for diphtheria and more than 2,000 sputa for tuberculosis.

A very large number of examinations were made in connection with typhoid fever and malaria. In addition a large number of tissues were examined for cancer and other disease processes, whilst foods and disinfectants of various kinds have been submitted from time to time for bacteriological examination. A large number of vaccines were also prepared for human diseases for curative purposes, the results in some cases being very striking.

Dengue Fever.—Probably the most important work carried out by the Laboratory during the year was an investigation into the means of spread of Dengue Fever on the North Coast of New South Wales. By means of mosquitoes caught in the infected area and transmitted to Sydney, the disease was conveyed to four individuals in Sydney, thus establishing the fact that dengue is spread by the Yellow Fever mosquito *Stegomyia fasciata*. Though dengue does not occur in Sydney, its occurrence in epidemic form in our northern coastal towns leads to great disorganisation of business and much commercial loss. Now that it is known definitely that the Yellow Fever mosquito, *Stegomyia fasciata*, is a transmitting agent, systematic measures may be adopted to destroy the breeding places of this pest and to prevent its entrance into houses. In this way, with intelligent co-operation between municipal authorities and the public, the occurrence of future epidemics of the disease should be capable of prevention.

Anti-typhoid Vaccine.—During the year 272,146 c.c. of anti-typhoid vaccine were prepared and supplied chiefly to the military authorities. The value of this protective measure is hardly realised by the general public,

public, and it is regretted that so few country towns have accepted the Department's offer to supply sufficient anti-typhoid vaccine to protect all the inhabitants of the district. In those districts which did accept the offer there has been a great diminution in the yearly number of typhoid cases.

VENEREAL DISEASES.

This important subject has had the Department's most serious attention, and a Select Committee has been appointed by Parliament to inquire into the best method of combating them.

To persons not acquainted with the difficulties of such a course notification seems to possess the most effective first measure to be adopted, but the English Royal Commission on Venereal Diseases, which presented its report in 1916, took a great deal of evidence bearing upon notification, and after the most careful and even anxious consideration members of the Commission unanimously decided not to recommend any system of notification, even of a confidential nature. In many quarters this decision caused great disappointment. The chief reasons to be urged for and against notification are that it has been applied to one infectious disease after another, with great benefit to the public health in such diseases as typhus and typhoid fever, small-pox, scarlet fever, and diphtheria. In tuberculosis also it is proving of great value. Notification tends to check the dissemination of these diseases, because it affords the opportunity of isolation of cases of acute infectious fevers, such as scarlet fever; which can be arranged for, either in a fever hospital or at the patient's own home, and, if necessary, certain measures of isolation enforced respecting those who have been in contact with such cases; also on recovery of the patient measures of disinfection are duly carried out.

Such measures are not applicable to venereal diseases, as these diseases are not infectious in the sense in which epidemic fevers are. Venereal diseases are *contagious*, the infection is not diffusive, is neither air-borne nor water-borne, and while it is necessary that the patient in the infective stages should avoid certain kinds of physical contact, and that articles contaminated by him, such as drinking vessels, should not be used by others, there is no need for isolation, which is frequently as impracticable as it is unnecessary. Nor is disinfection applicable to venereal diseases, for it is the patient who needs to be disinfected, not his surroundings, and the only way of disinfecting him is to cure him. This can only be accomplished by rendering accessible to him the best means of treatment, whatever his circumstances, and by bringing him to realise the grave and irremediable consequences of neglecting to use them. To attain these ends the patient must feel assured that the nature of his complaint will be kept secret.

The most effective method of dealing with these diseases will be by obtaining the co-operation of public hospitals throughout the State in regard to treatment of such patients, and measures in this direction are in contemplation.

I am convinced that the difficulty is not in inducing persons suffering from these diseases to submit themselves for treatment, but in securing the co-operation of hospitals, and provision of funds for the establishment of clinics for their treatment in convenient and suitable localities.

Negotiations are in progress with a view to inducing Sydney Hospital to establish a clinic on the lines of the one which has proved so successful at the Royal Prince Alfred Hospital.

REGULATIONS, INSTRUCTIONAL PAMPHLETS, &c.

During the year revised regulations were issued under the Pure Food Act and amendments to facilitate the working of the Act in certain respects are in course of drafting for submission to Parliament. Two other

other departmental pamphlets revised and reissued during the year were those containing "Advice to Mothers in regard to themselves and their infants"; and "Measures to be taken for the prevention of the Infectious Diseases—typhoid fever, scarlet fever, diphtheria, infantile paralysis and cerebro-spinal meningitis, and for domestic isolation and disinfection."

MOSQUITOES AND SPREAD OF DISEASES.

The introduction into New South Wales of several cases of malaria by means of returned soldiers, the opening of the Panama Canal, where yellow fever is endemic, and the occurrence on the northern rivers of an outbreak of dengue, focussed the attention of the Department upon mosquito-borne diseases, and it has in conjunction with the local government department formulated a code of ordinances under the Local Government Act, which enables a municipality to enforce an anti-mosquito campaign within its district.

The Departmental pamphlet, "How to get rid of the Mosquito," has also been revised, and copies made available for distribution.

CURING WOUNDS BY OPEN-AIR TREATMENT.

The Department by circulars directed the attention of the various country hospitals to the success obtained from the open-air treatment of wounds.

Sir Almroth Wright, Consulting Physician to the British Expeditionary Forces in France, has demonstrated during the war that septic wounds improve rapidly with open-air treatment, and the climate here is even more suitable than the climate of England for the carrying out of such treatment. The "First Eastern General Hospital," at Cambridge, was specially designed for the carrying out of such treatment, and the building is a very inexpensive one, as each ward has only three walls, the fourth side being open to the weather; and even the back wall has a large aperture protected by louveres to enable a very free circulation of air.

Shortage of doctors and nurses: The operations of the Department have been considerably hampered by the continued shortage of doctors and nurses.

COUNTRY AND SUBURBAN HOSPITAL AND MEDICAL INQUIRIES.

During the year four important inquiries were made in connection with hospitals and medical matters in country districts, and reports forwarded to the Minister. They were as under:—

Subsidising of doctor at Taralga: Inquiry conducted by Dr. A. A. Palmer, who considered a medical man, practising locally, would be a great boon to the district.

Inquiry into matters relating to Muswellbrook Hospital, conducted by Dr. Palmer, who found it was in the interests of the hospital that the matron should not remain there; she resigned.

Inquiry into the death—as a result of falling over the cliffs at Manly—of a boy in Manly Hospital. I conducted this inquiry and furnished a report to the Minister, wherein I recommended the administration of a censure to a member of the medical staff and the acceptance of the matron's resignation.

An inquiry was also made by an officer of the Department regarding the funds held by the Trustees of the old Adelong Hospital, and I recommended the payment of the trust funds to the Treasury.

DEPARTMENTAL

DEPARTMENTAL OFFICERS ON ACTIVE SERVICE.

During the year seventeen more officers from my staff answered their country's call, and left to join their comrades at the Front.

Names of Members of the Staff who have enlisted.

Name.	Date civil duty ceased.		
Lord, A. T.	5th January,	1916.
McLennan, S.	15th „	1916.
Perkins, J. A. T.	17th „	1916.
Baxter, E. A.	15th February,	1916.
Russell, A. R.	19th „	1916.
Roper, J.	4th „	1916.
Chambers, T. W.	21st March,	1916.
Booler, J. M.	29th „	1916.
Brown, D. B.	31st „	1916.
Slater, A....	6th April,	1916.
Horner, R.	29th „	1916.
Young, E.	1st May,	1916.
Steadman, W.	10th „	1916.
Williams, J. C.	17th „	1916.
Strange, G. M.	15th June,	1916.
Neville, P.	24th July,	1916.
Harrison, W. H....	31st October,	1916.

With great sorrow I record that during the year two of my staff have made the supreme sacrifice, Mr. C. G. Longworth, clerk to the Pure Food Branch, who enlisted on 1st October, 1915, died on 11th August from wounds received in France five days previously, and Mr. E. A. Baxter, attendant at the Liverpool State Hospital, who enlisted on 15th February, 1916, died on 4th December from wounds received in France. Mr. Baxter left a young widow and an infant son.

LATE CHIEF VETERINARY INSPECTOR, MR. C. J. VYNER.

It is with very great regret that I record the death of a very valuable officer. Mr. C. J. Vyner died on 31st March, 1916, after an illness extending over eight months. Mr. Vyner joined the Department in 1905, and was appointed Chief Veterinary Inspector in May, 1909.

DEATH OF NURSE ALICE E. P. MILES, COAST HOSPITAL.

A much regretted death was that of Nurse Alice Miles, a Coast Hospital nurse, in her third year of training, who joined the staff in September, 1913. Nurse Miles contracted pneumonia and died on 15th August, after a few day's illness.

RETIREMENT OF DR. JOSEPH A. BEATTIE.

I regret to say that Dr. J. A. Beattie, Senior Medical Superintendent, Liverpool State Hospital, Liverpool, found it necessary to retire owing to ill-health. Dr. Beattie, who had been in charge of Liverpool for thirty years, and during that period managed it most capably, was the recipient of a very handsome illuminated address from the Staff.

APPRECIATION OF STAFF.

I have again to record my appreciation of the assistance constantly rendered to me by the senior medical and clerical officers of my staff, and also by every other member of the professional, clerical, and general staffs.

I regret to have again to draw attention to the inadequate accommodation for the Head Office Staff. Unfortunately for the administrators of the Department it is cramped for room, having long outgrown the building erected for it in 1897. Extension of the health policy of the Government makes it essential that the accommodation provided for administrative purposes should be materially increased, and of a better character than that now available.

ASSISTANCE RENDERED BY OTHER DEPARTMENTS.

To other branches of the Public Service, particularly to the Crown Law Department, to the Inspector-General of Police and his officers, and to the Director of Agriculture and his staff of dairy inspectors, I again tender my thanks for the valuable assistance which has been rendered throughout the year in various directions in matters affecting the public health.

REPORTS ON BRANCHES.

A report by the officer-in-charge of each branch is appended hereto.

ROBERT T. PATON,

Director-General of Public Health.

T. H. NEELY, Secretary.

 PART I.

Public Health Administration.

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PART I.

Public Health Administration.

CHEMICAL LABORATORY.

REPORT OF GOVERNMENT ANALYST.

Staff.

Government Analyst: THOMAS COOKSEY, Ph.D., B.Sc., F.I.C.

Second Government Analyst: WILLIAM M. DOHERTY, F.I.C., F.C.S.

Senior Assistant Government Analyst: SIDNEY G. WALTON, F.C.S.

Assistant Government Analyst: HAROLD B. TAYLOR, B.Sc. (On active service.)

Laboratory Assistant: ARTHUR D. DIBLEY, A.T.C. (Absent on munitions work.)

„ „ FRANK M. ARMER.

Temporary Laboratory Assistant: L. G. HODGSON.

Scientific Cadet: GORDON O'BRIEN.

„ „ REXFORD G. HOOK.

Shorthand Writer and Typist: Miss GRACE MCGLYNN.

Attendant: VICTOR WILLIAMS.

To the Director-General of Public Health.

Sir,

I have the honor to submit to you the Annual Report of the Chemical Laboratory for the year 1916.

The samples examined during the year are embraced under the following heads:—

Samples submitted in connection with the administration of the Pure									
Food Act	..	..	..	..	..	..	..	..	9,770
Food samples taken from Troopships	..	..	..	..	..	..	..	..	665
Samples examined in connection with various public services of the									
State	..	..	..	..	..	..	..	..	1,262
Total	..	..	..	..	..	..	..	..	11,697

A comparison of the work carried out in the Laboratory during the last three years is shown in the table below:—

	1914.	1915.	1916.
Milk taken under the Pure Food Act	9,626	10,067	8,493
Samples other than milk taken under the Pure			
Food Act	1,496	1,053	1,277
Samples taken from Troopships	—	344	665
Samples <i>re</i> public services of the State	1,316	1,016	1,262
Totals	12,438	12,480	11,697

It will be noticed that while the number of milk samples decreased in 1916, there were 3,204 samples of a miscellaneous character submitted, representing a considerable increase over 1915. As the examination of the latter entails considerably more work and time than the former, the pressure of work during the year has been much greater than in previous years, and a good deal of difficulty was experienced at times in completing reports on samples within the statutory time prescribed for legal action to be taken.

The

The proportion of adulterations among the samples taken under the Pure Food Act in 1916 was slightly higher than in previous years, being $7\frac{1}{2}$ per cent. as against 6 per cent. in 1915. These adulterations included some curious examples, a few of which may be considered of sufficient interest to mention here. A ground coffee submitted was found on examination to consist largely of roasted beans or peas; a sample of pepper contained as high as 60 per cent. of ground shell or stones from some fruit or other seed; and a "blackberry" jam contained no blackberries whatever, but consisted of apple pulp artificially coloured.

Many of the cordials and soft drinks prepared and sold in country towns were found to be so dirty as to be unfit for consumption. This state of things is probably largely due to the lack of efficient filtering apparatus.

A great many drugs, patent medicines, pills, &c., were examined during the year, and prosecutions were undertaken on the results of analysis. Several much-advertised "flesh-formers" and "fat-producers" were proved to be worthless for the purposes for which they were sold, and substantial fines were imposed on the vendors. A couple of astonishing examples of the effrontery of the people who advertise and sell "cure-alls" were found in an "appendicitis cure," which was prepared from a mixture of cream of tartar, carbonate of soda, and tartaric acid; and a cancer cure, sold at a high price, which consisted simply of a weak solution of chloride of gold.

A regular examination of the food supplied to military transports was carried out during the year, and with beneficial results. This may be considered proved from the fact that, although the number of samples examined was almost double that of the preceding year (665 as against 344 in 1915), the proportion of samples failing to comply with the provisions of the Pure Food Act fell from 20 per cent. to 11 per cent.

An article of especial interest submitted by the military authorities was an alcoholic liquid equal in strength to rum, which had been prepared by a member of the German Concentration Camp by means of an illicit still made in the camp itself.

An interesting investigation was carried out with the object of ascertaining the radio-activity of the Moree Artesian Bore water. This water flows from the bore with a temperature of, approximately, 112° F., and is used in the baths for the treatment of various complaints more or less of a rheumatic character and for stiffness of the muscles and joints. It is reputed to be very efficient for this purpose, and it has been suggested that its efficacy is partly due to the presence of radio-active matter. The result of the examination showed that the amount of radio-active substance per litre of water was equivalent to that derived from one ten-millionth of a milligram of radium.

The most interesting of the criminal investigation cases were those submitted in connection with the I.W.W. charges, for which about twenty different exhibits were examined. The articles used for incendiary purposes consisted of cotton waste impregnated with nitre, the ignition being caused by the application of a mixture of carbon-bisulphide and turpentine containing phosphorus in solution. The majority of the deaths by poisoning investigated were found to be due to the use of strychnine. One case recorded was due to oxalic acid, and another remarkable case was that in which a woman died from drinking ordinary bottled beer which contained potassic cyanide. No evidence was adduced to show how the cyanide found its way into the beer.

In connection with the supply of food, materials, &c., to the various Government Departments, the Stores Supply Committee submitted 512 samples, consisting of drugs, foods, lubricants, paints, disinfectants, inks, soap, &c., &c. This number shows a substantial increase on that of previous years.

Tables showing details of the whole of the analyses carried out are submitted herewith.

I have, &c.,

THOMAS COOKSEY,

Government Analyst.

TABLE I.

SAMPLES examined during the year 1916 in connection with the administration of the Pure Food Act.

Nature of Sample.	Authority.	No. of Samples.	No. of Adulterations.
Baking powder	Food Inspectors	30	2
Biscuits (starchless)	"	7	5
Bread	"	20	.....
Butter	"	5	5
Butter oil	"	1	1
Coffee, coffee and chicory.....	"	17	3
Condensed milk	"	17	13
Cordials, drinks, &c.	"	45	19
Cream.....	"	4	.....
Cream of tartar.....	"	16	8
Cream of tartar substitutes	"	2	.....
Disinfectants	"	2	.....
Drugs, pills, medicines, &c.	"	182	53
Essences	"	8	4
Fish	"	1	.....
Ginger	"	1	.....
Honey	"	3	.....
Ice cream	"	43	25
Invalids' food	"	1	.....
Jam	"	27	10
Jelly crystals	"	1	.....
Lard	"	5	1
Margarine.....	"	2	1
Malt extract	"	1	1
Meals (breakfast).....	"	28	.....
Milk (metropolitan district)	"	2,107	137
,, " " "	Municipalities	4,755	220
,, " " "	Food Inspectors	926	121
,, " " "	Municipalities	705	38
Nut butter	Food Inspectors	1	1
Oils—Edible	"	25	.....
Pepper	"	13	9
Pickles	"	1	.....
Salt	"	1	.....
Sauco	"	14	4
Soap.....	"	45	19
Spirituous liquors	"	32	11
,, " "	Licensing Inspectors..	627	54
,, " "	Municipalities	5	.....
Suet	Food Inspectors	1	.....
Dripping	"	1	1
Sugar	"	4	2
Tea	"	22	3
Treacle	"	1	1
Vegetables (tinned)	"	1	.....
Vinegar.....	"	13	3
Water softener	"	1	.....
Totals.....		9,770	775

TABLE II.

SAMPLES examined during the year 1916 in connection with the Supply of Food to Military Transports.

Nature of Sample.	No. of Samples.	No of Adult-rations.
Arrowroot	1	.....
Baking powder.....	1	.....
Barley.....	1	.....
Butter.....	79	8
Cheese.....	1	.....
Chicory.....	1	.....
Cocoa	1	.....
Coffee.....	21	.....
Coffee and chicory.....	58	18
Condensed milk.....	58	9
Cordials, drinks, &c.	9	1
Cream of tartar	1	.....
Curry powder	1	.....
Flour	115	3
Jam.....	102	18
Margarine	5	2
Mustard.....	8	1
Oatmeal.....	22	.....
Pepper.....	55	11
Salt	1	.....
Sauce	2	.....
Semolina	1	.....
Tea.....	86	2
Vegetables.....	2	.....
Vinegar	33	7
Totals	665	80

TABLE III.

SAMPLES examined during the year 1916 in connection with the Public Services of the State.

Authority submitting.	Nature of Sample.	No. of Samples.
Stato Hospitals and Subsidised Charities	Arrowroot.....	1
" " "	Bread	12
" " "	Jelly crystals	1
" " "	Lubricating oil.....	1
" " "	Medicine	1
" " "	Milk.....	54
" " "	Oatmeal.....	1
" " "	Peasmeal	1
" " "	Sago	1
" " "	Sardines.....	1
" " "	Spirits	5
" " "	Sugar.....	2
" " "	Tea	2
Stores Supply Department	Baking powder	4
" "	Essenco	4
" "	Ammonium sulphide	1
" "	Chicory	3
" "	Disinfectant	90
" "	Ink	79
" "	Jelly crystals	2
" "	Keroseno.....	1
" "	Leather.....	1
" "	Linseed meal	3
" "	Lubricating oils	119
" "	Neurogen	1
" "	Plaster of Paris.....	2
" "	Paint.....	9
" "	Potassium iodide	1
" "	Pickles	1
" "	Sulphur	2
" "	Soap	182
" "	Tinc. opium.....	1
" "	Magnesium sulphate	2
" "	White zine	1
" "	Zinc oxide	3
Police Department	Criminal investigations	142
"	Human viscera	26
Public Works Department, Municipal and other authorities.....	Water	254
" " " "	Sewage	92
Various authorities	Caustic lye	3
"	Disinfectants	36
"	Drugs, medicines, &c.	76
"	Foods (various)	8
"	Sundries	25
"	Animal viscera.....	5
Total		1,262

PURE FOOD ACT, 1908.

REPORT OF THE CHIEF INSPECTOR OF FOODS ON THE GENERAL ADMINISTRATION
OF THE PURE FOOD ACT, 1908, DURING THE YEAR ENDED 31st DECEMBER,
1916.

Staff.

Chief Inspector : ARTHUR KENCH.

Metropolitan Inspectors : GUY A. GRIFFIN, JOHN WILLIAMS, ROBERT HORNE,
ARTHUR PATTON, WILLIAM ALLISON (on Active Service).

Country Inspectors : CHARLES V. FRANCIS, WILLIAM H. EILBECK.

Clerical Staff : RUPERT E. CUMMINS, Clerk and Assistant Inspector.

I have to report, with extreme sorrow, that Mr. CHARLES LONGWORTH, who was attached to this Branch as clerk when he enlisted on 1st October, 1915, died on 11th August, 1916, from wounds received in France.

I HAVE the honor to submit herewith a brief report of the work performed by the Pure Food Staff for the year ending 31st December, 1916.

In submitting this report I desire to point out that although very useful work has been accomplished, it is imperative that the Pure Food Staff should be considerably increased to ensure a more rigid and wider supervision of food products and their preparation, storage, and distribution throughout New South Wales.

The work of the staff comprises the regular and systematic inspection of all premises used in connection with the preparation, storage, and packing of foods and drugs for sale, also food products found on the said premises at time of inspection, including butchers' shops, smallgoods factories, bakeries, jam factories, milk stores, and ice-cream factories, condiment factories, manufacturing confectioners, restaurants and dining-rooms, general stores (retail and wholesale) and many wholesale bulk stores and distributing depôts.

The following is a review of some of the more important work of my branch during the year :—

Milk Supply.—The supervision of the handling and distribution of milk has received particular attention. For the year about 8,262 samples of milk have been procured from milk vendors, both in the metropolitan and country districts, all of which have been tested by the Government Analyst. Of this number, 3,013 samples were taken by the departmental food officers, and 5,249 samples by officers of municipal and shire councils. Special inspections have also been made of premises used for the storage and distribution of milk. In this connection may be mentioned the action taken on many occasions during the past twelve months by departmental officers against the keepers of restaurant and refreshment rooms for serving milk to customers, either for drinking or for consumption with other beverages, adulterated with large percentages of water. Proceedings instituted resulted in the imposition of fines ranging from £5 to £12.

Milk Receptacles.—Attention is constantly given to the state of cleanliness of milk receptacles used by dairymen and milk vendors. One practice that the Department is determined must cease is the use of rusty and worn-out lids, under which rags are frequently placed to prevent leakages. Wherever this insanitary condition has been found, the receptacles have been seized by the Pure Food Officers and destroyed, proceedings also being taken against the users. Occasionally, it has been found that traders had stopped the holes in their cans with rags, soap, or similar material.

Bread.—The subject of bread delivery and the premises of manufacturing pastry-cooks has received special attention, a thorough inspection being made of all premises used in connection with the preparation of bread and pastry for human consumption. In many cases, it was found necessary to prosecute traders in a large way of business for insanitary conditions, action being taken in ten instances during the year.

The question of bread delivery also received attention, and action taken during 1915-1916 has resulted in very great improvement in the methods adopted. Prosecutions were taken on several occasions against careless carters for failing to protect bread from dust whilst delivering to customers. The former general practice where carters carried bread on the footboard of their carts within a few feet of the horse, and unprotected from dust, has now almost wholly ceased, and this year only a few instances were met with in which bread was so exposed. The regulation dealing with this subject provides that all food consumed in the same state as it is sold shall be at all times protected from flies and dust until delivered to the purchaser.

Damaged and Deteriorated Food.—Special examinations are made of food stuffs exposed for sale in auction rooms, elsewhere by auction, and also of salvage goods. This close supervision is essential from the fact that it is frequently foods damaged by fire or water which are disposed of in this manner. During the year the officers of this Branch have carefully examined many tons of assorted groceries in auction rooms and elsewhere, with the result that the following goods, among others, have been seized and destroyed under the provisions of the Pure Food Act :—Mixed groceries, 45 tons; preserved fruits and dates, 14 tons; butter, 8½ tons; salted fish, 6 tons; flour, 5¾ tons; salt, 5 tons; rice,

rice, $4\frac{3}{4}$ tons; sugar, $3\frac{1}{2}$ tons; tomato pulp, $1\frac{1}{2}$ tons. Other articles of food seized and destroyed included $4\frac{1}{2}$ tons of meat; 2 tons of vegetables; 13,198 tins and 58 cases of fish; 702 tins and 83 cases of preserved fruits; and 36,067 bottles of patent medicines.

This work is of special importance from a public health point of view, for it is safe to say that prior to the passing of the Pure Food law all such goods found their way to the cheaper restaurants or to sauce, jam or pickle factories. The examination of salvage goods from one fire alone, which occurred in a large food warehouse, necessitated a considerable amount of work and resulted in over 50 tons of damaged foodstuffs being sent to the garbage tip under Departmental supervision. Included in the condemnations were 31 tons of dried fruits, 13 tons of tea, $1\frac{1}{4}$ tons of breakfast foods, and 50 cases, 2,500 boxes, and 698 tins of other assorted groceries.

Ice Cream and Ices.—During the year there have been several inspections of premises where ice cream is prepared, and a number of samples of ice-cream and ices have been taken and analysed, resulting in the prosecution of some eighteen traders for selling adulterated ice-cream. The result of chemical examination in these cases showed that the "ice-cream" was either deficient in milk-fat, or was the article commonly known as "ices," fraudulently sold as "ice-cream," there being a distinct difference between the two articles. Regulation 56 under the Pure Food Act requires, among other things, that "ice-cream" shall contain not less than 10 per centum of milk fat present in the form of cream; whereas "ices" may consist of a preparation of wholesome foodstuff, sterilised and pasteurised, and subsequently frozen without the addition of pure cream.

Premises Used for Preparing Food.—The structural condition of premises used for the preparation of food has received special attention. During the year 3,619 inspections have been made of factories and other premises used in connection with the preparation and storage of food, and a number of notices were served requiring traders to reconstruct their premises, in compliance with the Pure Food regulations; or to remedy insanitary defects. Many traders have also been prosecuted for not keeping their premises in a cleanly and sanitary condition, and have been fined in amounts ranging from £1 to £20.

Fruit Barrowmen.—Exposure of fruit on barrows and elsewhere in the public streets received attention, and several prosecutions were taken against barrowmen who were found selling fruit unfit for human consumption. In some of the more flagrant cases the whole of their stock was seized and destroyed. During these inspections it was noticed that dirty rags were used for the purpose of polishing the fruit; in one instance where a trader was found using a soiled handkerchief he was prosecuted and fined £2 and 6s. costs.

The Department is determined that the fraudulent practice of "topping up" fruit, and of selling to the public an article inferior to that which is shown, must be stopped. The quality shown must be supplied. In many cases it was found that traders exhibiting a good quality of fruit, and selling to the public apples, pears, bananas, and other fruit which was decomposed and unfit for consumption.

Manufacturing Confectioners.—A detailed inspection has been made of premises used for the manufacture of sweets and confectionery, and in several instances it was found necessary to institute proceedings for insanitary conditions existing; at a few premises the whole interior of the building, including walls, benches, floors, and utensils were found in a dirty condition. Special attention has also been given to the fruit products used in such manufacture, and it is mentioned with regret that many traders were found using damaged and deteriorated fruits for trade purposes. This particularly emphasises the need there is for additional inspectors to keep a watch on all foodstuffs handled by either the wholesale or retail trades.

Jam Manufactories.—These premises have also been examined, and in a few instances very unsatisfactory conditions were found to exist, some of our largest traders being found guilty of wilful neglect, not only in connection with the general condition of the premises, but also in regard to deteriorated food products stored thereon. Prosecutions taken by Departmental officers resulted in the imposition of fines ranging from £5 to £30.

Fish and Smallgoods Shops.—The question of the sanitary condition of these premises received considerable attention by Pure Food officers, and many notices were served requiring structural alterations; in some cases dirty and insanitary conditions were found, and in all cases where wilful neglect was apparent the traders were prosecuted, and fined in sums ranging from £5 to £10.

Falsely Described Remedies and "Cure-alls."—The Pure Food Branch also deals with patent medicines, and has throughout 1916 continued to give attention to misleading advertisements and falsely-described "cure-alls." Special investigations have been made in several instances into the methods adopted by such traders, and action taken to prevent the public being fraudulently misled by false labels, statements, and advertisements. Four traders in a large way of business, making a speciality of so-called "flesh foods," were successfully proceeded against for selling "flesh-forming tablets." Medical evidence was produced for the prosecution, showing that these tablets were useless for the purpose advertised; the proprietors were fined in amounts which ranged from £10 to £15 and costs.

Another "herbalist," advertising a so-called blood purifier, claimed to have been in business for over 25 years, and to have cured hundreds of patients suffering from various diseases. This so-called blood purifier was analysed, and in the opinion of medical men, who gave evidence for the prosecution, totally useless as a blood-purifier. This herbalist, who also followed the trade of coach-builder, was fined £10 for selling a falsely-described article, and £2 for manufacturing drugs under filthy conditions.

Food Inspection on Transports.—At the request of the Minister for Defence an officer of the Pure Food Branch has examined all foodstuffs and stores on transports since the outbreak of war, one officer being specially detailed for this work. This officer has examined the stores and food supplies on every transport which has left New South Wales during the year, and, where necessary, has seized and removed foods which in his opinion were unfit for consumption. He examined the food supplied to sixty-four transports, and removed 535 samples for analysis, all of which have been examined by the Government Analyst. The result of this regular inspection has been very beneficial, for in no instance this year has it been necessary to take legal proceedings, whereas in 1915 prosecutions were necessary in several instances.

Appended are summaries showing the work performed by my staff during the year in relation to the examination of food supplies and premises used in connection therewith; and comparative tables showing the number of samples taken by Departmental inspectors and municipal and shire officers.

ARTHUR KENCH,

Chief Inspector, Pure Food Branch.

SUMMARY OF WORK PERFORMED BY DEPARTMENTAL PURE FOOD INSPECTORS
DURING YEAR ENDING 31st DECEMBER, 1916.

Milk.

Number of samples taken in all parts of the State	3,013
Number of samples below standard.....	230
Number of warnings	116
Number of prosecutions.....	115
Amount of fines and costs	£496 17s.

Food and Drugs (other than milk).

Number of samples in all parts of the State	557
Number of samples below standard.....	172
Number of warnings	122
Number of prosecutions.....	50
Amount of fines and costs	£235 12s.

Food Premises Inspected.

Number of premises inspected in all parts of the State	4,731
Number of notices served.....	692
Number of prosecutions.....	95
Amount of fines and costs	£493 1s. 6d.

Prosecutions in cases where Food is unfit for consumption Seized and Destroyed.

Number of prosecutions.....	21
Amount of fines and costs	£77 9s.

Troopships.

Number of ships inspected	90
Number of samples taken	535

Summary of Legal Proceedings for Breaches of the Pure Food Act and Regulations.

	Prosecutions.	Fines and Costs.		
		£	s.	d.
Adulterated milk	115	496	17	0
Adulterated food and drugs	71	313	1	0
Unclean premises	95	493	1	6
General breaches of Act and Regulations	90	154	8	6
	371	£1,457	8	0

COMPARATIVE TABLE showing the number of Samples of Milk taken by Departmental Pure Food Inspectors and Municipal Inspectors in the Metropolitan and Country Districts for the year ended 31st December, 1916.

Metropolitan District.	Population.	No. of Samples taken by Departmental Pure Food Inspectors.					No. of Samples taken by Municipal Inspectors.				
		No. of Samples.	No. Adulterated.	No. of Warnings.	No. of Prosecutions.	Fines and Costs.	No. of Samples.	No. Adulterated.	No. of Warnings.	No. of Prosecutions.	Fines and Costs.
						£ s. d.					£ s. d.
Sydney	105,100	690	43	27	16	68 5 0	940	25	27	8	22 8 0
Alexandria	11,500	31	1	1	...	.....	57	2	1	1	2 6 0
Annandale	12,500	23	.....	.....	...	.....	.....	.....	.....	.....	.....
Ashfield	27,650	51	2	1	1	3 6 0	160	10	8	2	5 12 0
Auburn	10,790	11	3	1	2	10 12 0	60	5	5	...	.....
Balmain	33,540	72	3	2	1	5 6 0	141	1	1	...	.....
Bankstown	5,320	.....	.....	.....	...	.....	18	1	.....	1	2 6 0
Bexley	10,540	.....	.....	.....	...	.....	28	4	2	2	15 12 0
Botany	5,690	.....	.....	.....	...	.....	12	.....	.....	...	.....
Burwood	12,560	23	.....	.....	...	.....	49	2	1	1	5 6 0
Canterbury	24,930	28	8	6	2	.....	.....	.....	.....	...	.....
Concord	6,410	7	.....	.....	...	.....	75	2	2	...	.....
Darlington	3,880	26	.....	.....	...	.....	.....	.....	.....	...	.....
Drummoyne	13,550	14	3	1	2	10 12 0	25	.....	.....	...	.....
Enfield	5,630	24	3	3	...	.....	.....	.....	.....	...	.....
Ersleville	7,740	38	3	3	...	.....	80	4	2	2	6 12 0
Glebe	22,900	64	1	.....	1	0 16 0	285	10	7	3	7 18 0
Granville	11,070	.....	.....	.....	...	.....	32	4	1	3	5 14 0
Hunter's Hill	5,740	.....	.....	.....	...	.....	5	.....	.....	...	.....
Hurstville	10,470	18	2	2	...	.....	.....	.....	.....	...	.....
Kogarah	12,460	.....	.....	.....	...	.....	86	8	3	5	24 17 6
Lane Cove	4,910	.....	.....	.....	...	.....	7	1	.....	1	6 6 0
Leichhardt	27,920	40	3	2	1	10 6 0	78	3	2	1	.....
Lidcombe	3,940	9	.....	.....	...	.....	.....	.....	.....	...	.....
Liverpool	7,940	.....	.....	.....	...	.....	.....	.....	.....	...	.....
Munly	13,940	44	5	1	4	26 4 0	49	4	3	1	2 6 0
Marrickville	37,470	60	3	1	2	4 18 0	195	8	6	2	6 12 0
Mascot	8,600	.....	.....	.....	...	.....	14	.....	.....	...	.....
Mosman	17,030	70	4	3	1	20 6 0	.....	.....	.....	...	.....
Newtown	28,030	93	4	3	1	5 6 0	313	5	5	...	.....
North Sydney	41,090	48	2	2	...	.....	460	19	18	1	1 16 0
Paddington	26,110	128	5	2	3	7 8 0	69	3	2	1	.....
Parramatta	12,370	8	.....	.....	...	.....	114	2	2	...	.....
Petersham	24,010	38	2	.....	2	3 12 0	51	4	2	2	3 12 0
Prospect and Sherwood.	5,010	.....	.....	.....	...	.....	.....	.....	.....	...	.....
Randwick	32,560	58	1	.....	1	5 6 0	97	8	4	4	5 4 0
Redfern	25,240	79	2	1	1	3 6 0	414	16	14	2	12 12 0
Rockdale	19,890	6	.....	.....	...	.....	162	20	14	6	31 16 0
Ryde	9,200	9	.....	.....	...	.....	.....	.....	.....	...	.....
Smithfield and Fairfield.	3,060	5	2	1	1	3 6 0	.....	.....	.....	...	.....
St. Peters	10,680	3	1	.....	1	1 16 0	45	.....	.....	...	.....
Strathfield	5,560	36	4	1	3	15 18 0	43	.....	.....	...	.....
Vaucluse	2,470	4	1	1	...	.....	.....	.....	.....	...	.....
Waterloo	11,270	24	.....	.....	...	.....	23	1	1	...	.....
Waverley	27,400	65	6	2	4	14 4 0	192	13	10	3	11 18 0
Willoughby	20,720	13	3	2	1	6 6 0	.....	.....	.....	...	.....
Woollahra	20,270	80	3	3	...	.....	183	10	8	2	4 12 0
<i>Shires.</i>											
Hornsby	11,840	.....	.....	.....	...	.....	.....	.....	.....	...	.....
Kuring-gai	14,200	.....	.....	.....	...	.....	.....	.....	.....	...	.....
Warringah	5,410	.....	.....	.....	...	.....	.....	.....	.....	...	.....
Sutherland	5,110	9	2	1	1	8 6 0	.....	.....	.....	...	.....
Total	843,220	2,049	125	73	52	235 5 0	4,562	205	151	54	180 15 6

COMPARATIVE TABLE showing the number of Samples of Milk taken by Departmental Pure Food Inspectors in the Hunter River Combined Sanitary District, during the year ended 31st December, 1916.

Hunter River Sanitary District.	Population.	No. of Samples taken by Departmental Pure Food Inspectors.					No. of Samples taken by Municipal and Shire Inspectors.				
		No. of Samples.	No. Adulterated.	No. of Warnings.	No. of Prosecutions.	Fines and Costs.	No. of Samples.	No. Adulterated.	No. of Warnings.	No. of Prosecutions.	Fines and Costs.
<i>Municipalities.</i>						£ s. d.					£ s. d.
Adamstown	2,800	.....	.....	.....	...	.....	.....	.....	.....	...	.....
Carrington.....	2,580	.....	.....	.....	...	.....	.....	.....	.....	...	.....
East Maitland ...	3,230	17	.....	.....	...	.....	.....	.....	.....	...	.....
Greta	1,100	.....	.....	.....	...	.....	.....	.....	.....	...	.....
Hamilton	9,040	.....	.....	.....	...	.....	42	3	2	1	7 6 0
Lambton	2,700	.....	.....	.....	...	.....	.....	.....	.....	...	.....
Merewether	4,350	.....	.....	.....	...	.....	45	.....	.....	...	.....
Morpeth.....	1,030	.....	.....	.....	...	.....	.....	.....	.....	...	.....
Newcastle and District.	13,010	101	15	3	12	65 5 6	.....	.....	.....	...	.....
New Lambton ...	1,850	.....	.....	.....	...	.....	.....	.....	.....	...	.....
Raymond Terrance.	900	.....	.....	.....	...	.....	.....	.....	.....	...	.....
Singleton	2,980	18	.....	.....	...	.....	15	.....	.....	...	.....
Stockton	2,210	.....	.....	.....	...	.....	.....	.....	.....	...	.....
Wallsend	5,790	.....	.....	.....	...	.....	.....	.....	.....	...	.....
Waratah	5,210	29	5	3	2	5 12 0	.....	.....	.....	...	.....
West Maitland ..	8,510	17	.....	.....	...	.....	.....	.....	.....	...	.....
Wickham	9,210	.....	.....	.....	...	.....	.....	.....	.....	...	.....
<i>Shires.</i>											
Bolwarra	3,230	.....	.....	.....	...	.....	.....	.....	.....	...	.....
Cessnock	25,790	.....	.....	.....	...	.....	.....	.....	.....	...	.....
Lake Macquarie ..	16,630	.....	.....	.....	...	.....	6	2	.....	2	10 12 0
Port Stephens ...	4,060	.....	.....	.....	...	.....	.....	.....	.....	...	.....
Tarro	6,760	.....	.....	.....	...	.....	.....	.....	.....	...	.....
Total	132,960	182	20	6	14	70 17 6	108	5	2	3	17 18 0

COMPARATIVE TABLE showing the number of Samples of Milk taken in other Country Municipalities and Shires by Departmental Pure Food Inspectors and Municipal and Shire Inspectors during the year ended 31st December, 1916.

District.	Population.	No. of Samples taken by Departmental Pure Food Inspectors.					No. of Samples taken by Municipal and Shire Inspectors.				
		No. of Samples.	No. Adulterated.	No. of Warnings.	No. of Prosecutions.	Fines and Costs.	No. of Samples.	No. Adulterated.	No. of Warnings.	No. of Prosecutions.	Fines and Costs.
<i>Municipalities.</i>						£ s. d.					£ s. d.
Albany	6,440	36	3	2	1	10 6 0	.....	.....	.....	...	.....
Armidale	5,190	41	2	1	1	0 16 6	.....	.....	.....	...	.....
Barraba	1,230	2	2	.....	2	6 12 6	.....	.....	.....	...	.....
Bathurst	8,570	44	5	3	2	10 12 0	31	3	2	1	3 6 0
Berry	1,600	2	.....	.....	...	.....	.....	.....	.....	...	.....
Bingara	1,350	4	1	.....	1	6 6 0	.....	.....	.....	...	.....
Blayney ..	1,400	3	1	.....	1	2 6 0	.....	.....	.....	...	.....
Bourke	1,450	5	3	1	2	10 13 0	.....	.....	.....	...	.....
Bowral	1,730	7	1	1	...	.....	.....	.....	.....	...	.....
Casino	4,210	.....	.....	.....	...	.....	7	.....	.....	...	.....
Central Illawarra	5,210	3	.....	.....	...	.....	.....	.....	.....	...	.....
Cobar	3,000	.....	.....	.....	...	.....	10	.....	.....	...	.....
Coonamble	2,530	4	1	1	...	.....	.....	.....	.....	...	.....
Cootamundra ...	3,150	6	.....	.....	...	.....	.....	.....	.....	...	.....
Crowa	2,130	5	1	.....	1	4 6 0	.....	.....	.....	...	.....
Cowra	3,830	7	.....	.....	...	.....	27	4	1	3	16 4 0
Dubbo	4,660	3	1	.....	1	7 6 0	.....	.....	.....	...	.....
Forbes	5,160	3	2	1	1	10 6 0	.....	.....	.....	...	.....
Glen Innes	4,380	18	2	.....	2	14 2 6	5	.....	.....	...	.....
Goulburn	10,020	105	3	.....	3	6 8 0	.....	.....	.....	...	.....
Grafton	5,160	.....	.....	.....	...	.....	6	.....	.....	...	.....
Gulgong	1,730	6	5	.....	5	16 10 0	.....	.....	.....	...	.....
Gunnedah	3,210	7	.....	.....	...	.....	2	.....	.....	...	.....
Henty	700	4	2	1	1	.....	.....	.....	.....	...	.....
Inverell	5,130	15	1	.....	1	5 16 0	22	3	1	2	11 18 0
Junee	2,650	6	.....	.....	...	.....	14	1	.....	1	.....

COMPARATIVE TABLE, showing the number of Samples of Milk taken in other Country Municipalities and Shires by Departmental Pure Food Inspectors and Municipal and Shire Inspectors during the year ended 31st December, 1916—*continued.*

District.	Popu- lation.	No. of Samples taken by Departmental Pure Food Inspectors.					No. of Samples taken by Municipal and Shire Inspectors.				
		No. of Samples.	No. Adul- terated.	No. of Warnings.	No. of Prosecu- tions.	Fines and Costs.	No. of Samples.	No. Adul- terated.	No. of Warnings.	No. of Prosecu- tions.	Fines and Costs.
Municipalities— <i>continued.</i>											
Katoomba	6,510	.....	.....	.....	...	.....	56	1	1	...	.....
Kiama	1,580	4	.....	.....	...	.....	.....	.....	.....	...	.....
Lismore	8,010	.....	.....	.....	...	.....	64	2	1	1	0 16 0
Lithgow	9,720	.....	.....	.....	...	.....	92	2	1	1	4 4 0
Molong	1,440	4	.....	.....	...	.....	.....	.....	.....	...	.....
Moree	3,070	2	.....	.....	...	.....	.....	.....	.....	...	.....
Moss Vale	1,460	4	.....	.....	...	.....	.....	.....	.....	...	.....
Mudgee	2,960	36	3	1	2	10 12 0	.....	.....	.....	...	.....
Murrumbidgee .....	.....	5	1	.....	1	2 16 0	.....	.....	.....	...	.....
Irrigation Area.											
Murrumburrah ..	2,300	7	.....	.....	...	.....	.....	.....	.....	...	.....
Murrurundi	1,700	5	2	1	1	1 16 0	.....	.....	.....	...	.....
Murwillumbah ...	3,100	.....	.....	.....	...	.....	2	.....	.....	...	.....
Muswellbrook ...	1,880	12	.....	.....	...	.....	4	.....	.....	...	.....
Narrabri	2,470	10	.....	.....	...	.....	.....	.....	.....	...	.....
Narrandera	2,500	8	.....	.....	...	.....	.....	.....	.....	...	.....
North Illawarra ..	5,510	5	1	1	...	.....	.....	.....	.....	...	.....
Nowra	1,870	4	1	1	1	.....	.....	.....	.....	...	.....
Nyngan	1,150	6	3	.....	3	11 18 0	.....	.....	.....	...	.....
Orange	7,110	64	1	.....	1	2 6 0	.....	.....	.....	...	.....
Parkes	3,250	9	.....	.....	...	.....	21	2	1	1	26 5 0
Peak Hill	1,330	6	1	.....	1	5 16 0	.....	.....	.....	...	.....
Picton	940	4	1	1	...	.....	.....	.....	.....	...	.....
Queanbeyan	1,280	4	1	1	...	.....	.....	.....	.....	...	.....
Quirindi	2,500	2	.....	.....	...	.....	5	2	.....	2	2 12 0
Scone	1,190	3	.....	.....	...	.....	.....	.....	.....	...	.....
Tamworth	7,740	33	2	.....	2	4 2 6	.....	.....	.....	...	.....
Temora	3,260	6	.....	.....	...	.....	10	.....	.....	...	.....
Uralla	1,080	1	.....	.....	...	.....	.....	.....	.....	...	.....
Wagga Wagga ...	6,960	.....	.....	.....	...	.....	81	9	5	4	16 5 0
Walcha	1,390	3	1	1	...	.....	.....	.....	.....	...	.....
Warren	1,070	3	1	.....	1	.....	.....	.....	.....	...	.....
Wellington	4,210	31	3	.....	3	18 18 0	.....	.....	.....	...	.....
Werris Creek.....	1,500	3	.....	.....	...	.....	.....	.....	.....	...	.....
Windsor.....	3,410	5	.....	.....	...	.....	10	.....	.....	...	.....
Wollongong	5,310	27	4	3	1	2 6 0	.....	.....	.....	...	.....
Yass	2,080	10	1	1	...	.....	.....	.....	.....	...	.....
Young	3,360	19	2	1	1	1 6 0	46	2	1	1	2 7 6
Shires.											
Blaxland	10,020	18	.....	.....	...	.....	.....	.....	.....	...	.....
Blue Mountain ..	8,210	.....	.....	.....	...	.....	30	.....	.....	...	.....
Bulli Shire.....	16,080	53	17	12	5	12 10 0	34	6	6	...	.....
Culcairn	4,460	4	.....	.....	...	.....	.....	.....	.....	...	.....
Dalgety	4,260	4	.....	.....	...	.....	.....	.....	.....	...	.....
Dorrigo	7,460	3	.....	.....	...	.....	.....	.....	.....	...	.....
Gadara	6,660	1	.....	.....	...	.....	.....	.....	.....	...	.....
Gilgandra	4,660	4	.....	.....	...	.....	.....	.....	.....	...	.....
Gunning	3,280	2	1	.....	1	2 16 0	.....	.....	.....	...	.....
Lockhart	4,880	2	2	2	...	.....	.....	.....	.....	...	.....
Lyndhurst.....	6,960	3	1	.....	1	1 6 0	.....	.....	.....	...	.....
Namoi	8,290	4	.....	.....	...	.....	.....	.....	.....	...	.....
Hunter River Combined Sani- tary district.	132,960	182	20	6	14	70 17 6	108	5	2	3	10 12 0
Total for Country districts.	429,600	964	106	43	63	261 12 6	687	42	22	20	101 15 0
Total for Metro- politan dis- tricts.	843,220	2,049	125	73	52	235 17 0	4,562	205	151	54	180 15 6
GRAND TOTAL ...	1,272,820	3,013	231	116	115	497 9 6	5,249	247	173	74	282 10 6

TABLE showing the Samples of Food and Drugs, other than Milk, taken by Departmental Pure Food Inspectors during the year ended 31st December, 1916.

Article.	No. of Samples.	No. below Standard.	No. of Warnings.	No. of Prosecutions.	Amount of Fines and Costs.
					£ s. d.
Baking powder	32	2	1	1	10 6 0
Beer	1	1	1	...	.....
Biscuits	4	2	2	...	.....
Brandy.....	5	1	...	1	2 6 0
Bread	22	3	3	...	.....
Breakfast foods	26	...	...	...	.....
Butter	6	5	2	3	24 18 0
Camphorated oil	11	...	...	...	.....
Coffee	2	1	1	...	.....
Coffee and chicory	15	1	1	...	.....
Cod-liver oil	1	...	...	...	.....
Condensed milk	6	3	3	...	.....
Cordials	40	22	15	7	50 2 0
Cream	4	...	...	...	.....
Cream of tartar	16	2	2	...	.....
Disinfectants	1	...	...	...	.....
Dripping	2	1	1	...	.....
Drugs	105	43	35	8	71 18 0
Edible oils	25	...	...	...	.....
Essences	8	5	5	...	.....
Eucalyptus oil	6	...	...	...	.....
Fish (dried)	1	...	...	...	.....
Flour	1	1	1	...	.....
Fruit (pulp)	1	...	...	...	.....
Gin	1	1	1	...	.....
Ginger (preserved)	1	...	...	...	.....
Golden syrup	1	...	...	...	.....
Honey.....	3	...	...	...	.....
Ice cream.....	40	24	6	18	34 15 0
Jam	26	10	10	...	.....
Jelly crystals	1	...	...	...	.....
Lard	5	1	1	...	.....
Lime-water	1	...	...	...	.....
Margarine	2	1	1	...	.....
Ointments	13	1	1	...	.....
Pepper	13	3	3	...	.....
Pickles	1	...	...	...	.....
Rum	9	4	...	4	14 4 0
Salts	1	1	1	...	.....
Sauce	15	4	3	1	1 6 6
Soap	46	15	15	...	.....
Sugar	4	4	4	...	.....
Tea	2	1	1	...	.....
Treacle	1	...	...	...	.....
Vegetables	1	...	...	...	.....
Vinegar	12	4	2	2	1 6 6
Wheatmeal	1	...	...	...	.....
Whisky	16	5	...	5	24 10 0
Total	557	172	122	50	235 12 0

TABLE showing the nature of Food Samples taken by Departmental Pure Food Inspectors from Transports and Troopships during the year ended 31st December, 1916.

Article.	No. of Samples.	No. below Standard.	Article.	No. of Samples.	No. below Standard.
Arrowroot	1	...	Margarine	2	2
Baking powder	1	1	Milk (condensed)	42	7
Barley	1	...	Mustard	6	...
Butter	65	8	Oatmeal	16	...
Cheese	1	...	Peas	1	...
Cocoa	1	...	Pepper	44	12
Coffee	16	...	Salt	1	...
Coffee and chicory	15	13	Sauce	2	...
Cordials	8	1	Sugar	12	...
Cream of tartar.....	1	1	Tea	65	1
Curry powder	1	...	Vinegar	26	4
Flour	88	4			
Jam	82	15	Total	535	69
Lentils	1	...			

Number of troopships inspected, 90.

TABLE showing the nature and quantities of Deteriorated and Damaged Goods seized and destroyed by Departmental Food Inspectors during the year ended 31st December, 1916.

Article.	Quantities.				Prosecu- tions.	Amount of Fines and Costs.
	tons cwt. qrs. lb.					£ s. d.
Alum.....	0	0	1	10		
Bacon	0	0	0	15		
Baking powder	0	1	0	0	108 tins	
Barley	0	8	2	10		
Biscuits	0	1	3	7	2½ sacks	
Breakfast foods.....	1	12	2	18	7½ cases.....	
Butter	8	10	3	11		
Capers.....	2	8	0	0	2 cases	
Cheese.....	0	5	2	4	139 tins.....	
Cocoanut	0	5	2	0		
Cocoa.....					4 cases, 438 packets.....	
Coffee essence					16 bottles	
Confectionery	0	9	2	26	2 cases	
Cornflour	0	4	0	4		
Cream					9 tins	
Cream of tartar	0	16	0	0		
Custard powder					1,988 powders, 6 cases....	
Curry powder					80 tins.....	
Dates.....	4	13	2	0		
Drugs					200 packets, 36,067 bottles	
Egg powder					12 tins, 58 cases.....	
Fish					13,200 tins	2 4 12 0
„ (ling, &c)	6	14	1	14		
Fruit	11	8	0	0	401 cases	8 18 16 6
do (preserved)	48	17	2	8	705 tins, 83 cases.....	5 27 0 0
Flavouring essences					120 bottles	
Flour.....	5	17	2	19		
Gelatine	0	3	2	0	1 case	
Ginger	0	2	1	5		
Groceries (mixed).....	45	2	0	0		
Hams					3 hams	
Infants and invalids' foods					4 cases, 436 tins	
Jam	0	2	3	11	579 tins	2 2 12 0
„ (pulp)	0	7	0	23		
Jelly crystals					1 case	
Lemonade crystals					63 tins.....	
Lemon peel	0	1	0	8	2 boxes.....	
Macaroni	0	17	3	11		
Margarine.....					1 case	
Meat	4	7	0	22		1 15 6 0
Do (preserved)					1,344 tins.....	
Milk (condensed).....					3 cases, 5,082 tins	1 5 6 0
Milk foods					205 tins	
Mustard.....	0	1	1	5	9 cases	
Nuts	0	19	3	16	85 bags.....	
Peas	0	8	0	1	36 sacks	
Pepper	0	0	0	10		
Pickles					11 bottles.....	
Pimento berries	4	10	0	7		
Potatoes					94 bags	
Rabbits					3,406	
Do (tinned).....	0	1	0	0		
Rice.....	4	18	2	18	7 tins	
Salt	5	5	0	0		
Salts (Epsom)					1 box	
Sauce.....					11 bottles.....	
Soup					127 tins	
Sugar.....	3	11	2	2		2 3 16 6
Tea	13	1	3	10		
Tomato pulp.....	1	11	1	11		
Wild boar's head	0	1	0	0		
Vegetables.....	2	0	0	16	7 bags	
Vinegar.....					51 gals.	
Total	180	10	0	14		21 77 9 0

TABLE showing the Inspections made during the year ended 31st December, 1916, by Departmental Pure Food Inspectors of Premises in the Metropolitan District used for the preparation, storage, or sale of Food.

Metropolitan District.	Bakers and Pastrycooks.	Butchers.	Confectioners.	Cordial Makers.	Dairies.	Fish.	Fruiters and Grocers.	Grocers.	Hotels.	Jam, Sauce and Pickle Factories.	Margarine Factories.	Milk Vendors.	Refreshment-rooms and Restaurants.	Small goods.	Stores.	Various.	Notices.	Prosecutions.	Amount of Fines and Costs.	Total.
Sydney	19	64	79	12	...	47	127	121	1	7	...	3	430	55	...	55	73	12	£ s. d.	1,020
Alexandria	3	1	2	1	...	4	10	17	...	4	...	3	12	3	...	1	10	1	73 8 0	51
Annandale	1	12	3	...	...	1	2	7	...	4	...	6	6	1	...	1	1	4	17 1 0	34
Ashfield	1	14	1	...	...	5	3	5	...	...	...	1	10	4	...	...	7	...	...	44
Auburn	13	5	1	...	...	12	6	...	...	...	...	...	12	...	...	...	3	...	...	31
Balmain	10	15	...	...	...	3	2	12	...	...	...	...	12	...	...	...	12	...	...	46
Burwood	8	12	2	...	...	4	6	3	...	...	...	...	5	...	1	...	4	2	9 12 0	43
Canterbury	9	11	7	...	...	4	9	13	...	...	...	...	6	...	...	12	7	...	...	68
Darlington	3	12	1	...	...	12	1	1	...	1	1	...	...	...	...	...	1	1	4 6 0	15
Drummoyle	7	6	2	...	...	3	3	...	...	...	...	...	6	...	...	...	12	...	...	26
Erskineville	1	...	...	...	...	12	8	10	...	3	...	1	...	1	...	...	10	...	...	26
Glebe	4	3	11	...	...	5	9	22	...	6	...	...	5	5	...	1	3	1	5 6 0	71
Granville	12	4	1	...	...	12	12	...	...	...	...	...	3	4	...	...	2	...	...	18
Hornsby Shire	3	12	...	...	...	1	6	...	...	...	...	...	12	12	...	...	...	...	...	16
Hurstville	1	5	3	...	...	2	8	...	...	1	...	...	1	12	...	...	10	2	5 15 0	31
Kogarah	4	3	1	...	...	2	1	5	...	...	...	...	1	1	...	...	6	...	...	18
Kuring-gai Shire	3	7	2	...	1	...	5	4	...	...	...	1	3	3	...	...	4	1	5 6 0	29
Lane Cove	5	5	...	...	...	...	1	...	...	...	...	...	...	...	...	...	1	...	...	6
Leichhardt	5	8	6	...	...	4	1	14	...	2	1	1	1	4	...	2	16	2	11 5 0	49
Lidcombe	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
Liverpool	4	3	5	1	...	1	5	1	...	...	...	1	5	...	...	...	13	...	...	28
Manly	4	6	3	...	...	3	1	...	...	...	...	3	12	...	...	4	2	...	...	35
Marriekville	10	8	10	...	...	2	8	15	...	...	...	12	4	8	...	...	10	1	1 6 0	67
Mosman	4	7	1	...	...	2	2	4	...	...	...	1	9	5	...	...	8	...	...	35
Newtown	7	15	15	...	2	10	18	9	...	3	...	...	29	9	...	5	16	2	6 2 0	122
North Sydney	10	24	7	...	...	9	8	7	...	...	...	...	4	13	...	...	8	...	...	82
Paddington	12	18	10	...	3	9	14	27	...	3	...	1	29	9	...	...	21	1	19 6 0	136
Parramatta	6	15	...	...	1	6	14	5	...	...	...	1	13	1	...	...	4	1	10 6 0	62
Petersham	4	1	2	1	...	2	2	...	...	3	...	2	10	1	...	1	2	1	5 6 0	29
Prospect and Sherwood	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
Randwick	3	14	...	...	...	...	...	...	...	...	...	1	13	4	...	...	2	...	...	54
Redfern	9	12	7	...	...	10	19	32	...	...	...	2	7	8	...	10	16	5	33 13 0	116
Rockdale	6	13	...	...	...	5	5	...	...	...	...	...	7	10	...	1	6	...	...	63
St. Peters	11	13	4	4	...	12	18	17	...	...	...	1	1	5	...	...	44	4	12 14 0	76
Strathfield	1	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	3
Sutherland Shire	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
Vaucluse	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	6
Waterloo	1	2	...	...	...	1	6	12	...	3	...	...	3	17	...	...	...	...	2 6 0	62
Waverley	1	7	...	1	...	2	11	7	...	1	...	...	13	...	...	...	2	...	9 15 0	48
Willoughby	3	6	...	...	...	2	4	...	...	...	...	...	7	...	...	...	4	...	...	31
Woolahra .....	...	5	...	...	2	3	15	12	...	...	...	2	11	...	...	...	6	4	37 4 0	60
Total	194	349	203	20	9	162	362	412	1	41	2	33	671	211	...	50	343	48	383 3 0	2,760

TABLE showing the Inspections made during the year ended 31st December, 1916, by Departmental Pure Food Inspectors of Premises in Country Districts used for the preparation, storage, or sale of Food.

Country Districts.	Bakers and Pastrycooks.	Butchers.	Confectioners.	Cordial Makers.	Dairies.	Fish.	Fruiters and Grocers.	Grocers.	Hotels.	Jam, Sauce and Pickle Factories.	Margarine Factories.	Milk Vendors.	Refreshment-rooms and Restaurants.	Small goods.	Stores.	Various.	Notices.	Prosecutions.	Amount of Fines and Costs.	Total.
Abererombie Shire	2	2	...	1	...	...	1	2	...	...	...	...	...	...	3	...	2	...	£ s. d.	8
Albury .....	...	...	...	...	...	4	1	...	...	...	...	...	4	...	...	3	...	...	...	15
Armidale	7	10	...	3	...	1	1	...	...	...	...	...	4	12	5	...	8	1	3 7 0	33
Bannockburn Shire	1	1	...	...	...	...	1	2	1	...	...	...	...	...	...	...	...	...	...	8
Balranald	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	2
Barrabra	4	3	...	1	...	...	4	...	...	...	...	...	5	...	3	...	3	...	...	18
Bathurst	11	8	...	3	...	5	3	6	...	1	...	...	4	1	3	...	4	1	3 9 0	45
Berry	2	4	...	3	...	...	1	3	...	...	...	...	...	...	7	1	4	...	...	21
Bingarra	4	3	...	1	...	...	1	...	...	...	...	...	12	...	...	...	9	...	...	11
Bland Shire	4	3	...	1	...	1	1	...	...	...	...	...	12	...	...	...	1	...	...	14
Blaxland Shire	5	7	1	5	...	...	1	7	...	...	...	...	12	...	...	...	4	1	3 6 0	21
Blayney	2	4	2	...	...	1	4	2	...	...	...	...	4	...	4	...	3	1	5 2 0	23
Biggaburi	1	2	...	1	...	1	1	...	...	...	...	...	...	...	6	...	...	...	...	12
Boree Shire	2	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	3
Bourke	3	4	...	2	...	...	1	...	...	...	...	...	4	...	9	...	5	...	...	24
Bowral	3	3	...	...	...	...	2	...	...	...	...	...	4	...	...	...	1	...	...	12
Brewarrina	1	1	...	...	...	3	...	...	...	...	...	...	...	...	3	...	5	...	...	11
Bull Shire	19	17	4	8	...	...	1	16	12	...	...	...	1	5	21	9	21	1	2 6 0	113
Cambewarra Shire	2	5	...	...	...	...	...	2	...	...	...	...	...	...	2	...	3	1	3 6 0	11
Canoblas Shire .....	...	1	...	...	...	...	...	...	...	1	...	...	1	...	1	...	1	...	...	4
Caregar	1	2	...	...	...	...	1	...	...	...	...	...	1	...	4	...	2	...	...	9
Central Illawarra	1	2	...	...	...	...	1	2	...	...	...	...	...	...	...	...	2	...	...	6
Cessnock Shire	2	4	2	...	...	...	4	1	...	...	...	...	10	1	...	...	15	1	2 6 0	26
Cobbora Shire	2	2	...	...	...	...	1	...	...	...	...	...	12	...	...	...	6	...	...	11
Coonamble	4	4	7	1	4	...	1	1	1	...	...	...	5	...	13	...	9	1	21 7 0	37
Cootamundra	5	5	1	...	...	...	7	...	...	...	...	11	...	...	...	...	9	2	10 12 0	34
Corowa	2	2	...	...	...	...	...	5	...	...	...	...	6	...	...	...	2	...	...	16
Cowra	2	2	...	1	...	...	1	2	1	...	...	...	7	...	10	1	1	1	2 6 0	30
Culcairn Shire	8	3	...	...	...	...	...	...	...	...	...	...	3	...	...	...	4	...	...	17
Dalgety Shire	1	2	...	...	...	...	...	...	...	...	...	...	...	...	4	...	3	...	...	7
Demondrille Shire	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	1	2	...	...	6
Dubbo	6	5	...	...	...	...	...	...	...	...	...	...	7	...	6	1	11	1	6 7 0	29
Dungog	2	4	...	...	...	...	1	3	...	...	...	...	4	...	...	1	6	...	...	16
East Maitland	2	3	...	...	...	...	...	...	...	...	...	...	4	...	...	...	2	...	...	12
Erina Shire	4	4	...	1	...	...	2	3	...	...	...	...	4	...	...	...	2	...	...	20
Forbes	1	3	...	...	...	...	1	...	...	...	...	...	...	...	...	...	1	...	...	11
Gadara Shire	3	1	...	1	...	1	1	...	...	1	...	...	1	...	4	...	2	...	...	10
Gerrington	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	2
Glen Innes	9	11	...	...	...	3	9	...	...	...	...	...	1	1	7	...	2	...	...	41
Goolang Shire	1	1	...	...	...	...	1	...	...	...	...	...	1	...	1	...	5	...	...	7
Goodradigbee Shire	2	2	...	...	...	...	3	...	...	...	...	...	...	...	...	...	3	2	7 12 0	7
Goulburn	6	6	...	...	...	...	1	12	...	...	...	...	4	...	...	...	...	...	...	31

INSPECTIONS made by the Departmental Pure Food Inspectors—Country Districts—*continued*.

Country Districts.	Bakers and Pastrycooks.	Butchers.	Confectioners.	Cordial Makers.	Dairies.	Fish.	Fruiters and Greengrocers.	Grocers.	Hotels.	Jam, Sauce and Pickle Factories.	Margarine Factories.	Milk Vendors.	Refreshment-rooms and Restaurants.	Smallgoods.	Stores.	Various.	Notices.	Prosecutions.	Amount of Fines and Costs	Total.
Grenfell	3	3	2	...	...	1	1	1	...	...	...	...	2	1	1	...	1	2	£ s. d. 4 15 6	15
Gulgong	5	6	...	4	...	...	...	2	...	...	...	...	5	...	5	...	3	1	0 11 0	27
Gundagai	2	...	...	...	...	1	...	...	...	...	...	...	1	...	6	...	...	...	...	1
Gunnedah .....	...	...	...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	14
Gunning Shire .....	...	...	...	1	...	...	...	...	...	...	...	...	1	...	...	1	...	...	...	6
Guyra	2	2	2	1	...	1	...	...	...	...	...	...	2	...	...	...	2	...	...	7
Hillgrove	2	2	2	1	...	...	...	...	...	...	...	...	2	...	5	...	...	...	...	16
Inverell	2	2	2	...	...	1	...	6	...	...	...	...	2	...	...	...	...	...	5 12 0	25
Jamberoo .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2
Junee .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1	4 7 0	2
Klarna	2	2	...	2	...	...	2	...	...	...	...	...	4	...	...	2	...	1	1 16 0	21
Liverpool Plains Shire	1	1	...	...	...	...	...	...	...	...	...	...	...	...	3	...	1	...	...	5
Lockhart	3	3	...	...	...	1	...	...	...	...	...	...	...	...	6	...	4	...	...	19
Lyndhurst Shire	11	6	1	...	...	...	...	10	...	...	...	...	6	...	1	...	...	...	...	31
Manilla	3	3	...	2	...	...	...	3	...	...	...	...	2	...	...	...	5	...	...	13
Molong	2	2	...	...	...	...	1	...	...	...	...	...	1	...	...	...	...	...	...	6
Moree	1	3	...	...	...	...	...	5	...	...	...	...	5	...	...	...	...	...	...	14
Moruya	1	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	6	...	...	2
Moss Vale	8	8	...	5	...	2	7	15	...	...	...	...	1	...	...	...	...	...	9 15 0	46
Mudgee	3	6	2	7	...	1	3	5	...	...	...	...	2	...	...	3	...	...	...	32
Mulwarrie Shire	1	3	...	...	...	...	...	1	...	...	...	...	2	...	...	1	...	...	7 13 0	6
Murrumbidgee Irrigation Area	3	2	...	...	...	1	...	...	...	...	...	...	2	...	...	...	...	...	...	8
Murrumbidgee	12	3	...	...	...	...	...	...	...	...	...	...	3	1	...	...	...	...	...	9
Muswellbrook	5	6	...	1	...	2	2	...	...	...	...	...	5	...	11	...	...	...	...	32
Namoi Shire	1	1	...	1	...	1	...	...	...	...	...	...	1	...	3	...	...	...	...	8
Narrabri	4	9	...	1	...	...	2	...	...	...	...	...	11	...	5	...	...	...	...	24
Narraburra	1	1	...	1	...	1	1	...	...	...	...	...	...	...	3	...	1	...	5 6 0	8
Narrandera	3	3	...	1	...	1	2	...	...	...	...	...	4	...	5	...	...	...	4 12 0	19
Narrongine	2	2	...	...	...	1	3	...	...	...	...	...	4	...	7	...	...	...	...	19
Newcastle and District .....	...	2	2	...	...	20	11	2	...	...	...	2	40	2	6	...	1	6	13 16 0	87
North Illawarra	1	3	...	...	...	...	3	...	...	...	...	...	2	...	...	...	2	1	3 6 0	9
Nowra	3	6	...	2	...	2	1	...	...	...	...	...	3	...	6	...	...	...	...	23
Nyngan	4	6	...	4	...	...	10	5	...	...	...	...	15	...	10	...	5	1	5 6 0	54
Orange	10	13	2	6	...	2	13	...	...	...	...	...	6	...	7	...	6	1	4 6 0	64
Parkes	7	6	...	...	...	2	6	...	1	...	...	...	10	...	13	...	6	...	...	45
Peak Hill	4	4	...	...	...	...	4	...	...	...	...	...	3	...	5	...	3	...	...	21
Peel Shire	1	1	...	...	...	...	...	...	1	...	...	...	1	...	2	...	...	...	...	6
Pieton	2	4	...	1	...	...	2	...	...	...	...	...	...	...	...	...	5	...	...	11
Quirindi	1	1	...	...	...	...	...	...	...	...	...	...	1	...	...	...	1	...	...	3
Rylstone Shire	2	3	...	1	...	...	...	6	...	...	...	...	...	...	1	...	...	...	...	13
Seone	1	3	...	...	...	...	...	...	...	...	...	...	1	...	...	...	2	...	13 12 0	5
Shellharbour	1	1	...	...	...	...	1	...	3	...	...	...	...	...	2	...	...	...	...	8
Singleton	5	5	...	1	...	...	...	...	...	...	...	...	1	...	1	...	9	...	...	16
Tamworth	6	5	3	...	...	3	4	...	2	...	...	...	17	...	12	1	...	...	...	53
Temora	3	4	...	...	...	2	2	...	2	...	...	...	1	...	1	...	5	1	10 6 0	15
Uralla	2	2	...	...	...	1	...	...	...	...	...	...	...	...	...	...	3	...	...	5
Wagga Wagga .....	...	...	...	...	...	1	2	...	...	...	...	...	1	...	2	7	...	...	...	13
Walcha	2	2	...	1	...	1	...	...	...	...	...	...	...	...	...	...	2	...	...	6
Wallendbeen	1	1	...	...	...	...	1	...	...	...	...	...	3	...	...	...	1	...	...	8
Warialda	2	1	...	...	...	...	4	...	...	...	...	...	...	...	...	...	...	...	...	7
Waugoola Shire	2	2	...	...	...	...	1	...	...	...	...	...	2	...	3	...	...	...	...	10
Wellington	11	3	...	2	...	2	6	...	...	...	...	...	1	...	3	...	12	2	13 12 0	40
Wentworth	1	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	3	...	...	3
Werris Creek	2	2	...	...	...	1	...	...	...	...	...	...	3	...	2	...	1	...	...	10
West Maitland .....	...	3	...	...	...	...	1	...	...	...	...	...	1	...	1	...	1	1	6 6 0	6
West Narrabri .....	...	1	...	...	...	...	2	...	...	...	...	...	...	...	...	...	1	...	...	3
Windsor	3	2	...	1	...	...	...	...	...	...	...	...	1	...	11	...	2	...	...	18
Wingadee Shire	1	1	...	...	...	...	...	...	2	...	...	...	4	...	3	...	...	...	...	11
Wingecarribee Shire	4	6	...	2	...	...	3	...	...	...	...	...	...	...	...	...	3	...	4 6 0	16
Wollongong	10	14	2	5	...	6	11	14	...	...	...	...	16	...	...	...	7	2	12 12 0	78
Yass	2	3	2	...	...	...	4	...	...	...	...	...	4	...	...	...	7	1	3 6 0	15
Young	6	3	1	...	...	...	3	...	...	...	...	...	9	...	13	4	...	...	...	40
Country Total	323	359	28	103	3	90	172	186	19	2	...	2	225	14	310	36	349	47	199 6 6	1,150
Metropolitan Total	194	349	203	20	9	162	362	412	1	41	2	33	671	211	...	90	343	48	286 3 0	2,760
Grand Total	517	707	231	123	12	252	534	598	20	43	2	35	896	225	310	126	692	95	493 1 6	4,731

SUMMARY of Work performed by Departmental Pure Food Inspectors under the Pure Food Act, 1908, from 1st October, 1909, to 31st December, 1916.

Milk.

Year.	No. of Samples Collected.	No. below Standard.	No. of Prosecutions.	Amount of Fines and Costs.
1909-10	2,155	279	185	£ s. d. 860 5 7
1911	1,963	248	132	829 9 6
1912	2,990	436	210	1,124 4 0
1913	3,519	322	144	709 17 0
1914	3,980	291	189	837 11 0
1915	4,338	312	196	803 17 0
1916	3,013	230	115	496 17 0
	21,958	2,118	1,171	£5,662 1 1

SUMMARY of Work performed—*continued*.*Foods (other than Milk) and Drugs.*

Year.	No. of Samples Collected.	No. below Standard.	No. of Prosecutions.	Amount of Fines and Costs.		
				£	s.	d.
1909-10	391	49	41	150	4	0
1911	830	245	171	451	0	6
1912	593	71	71	148	17	0
1913	641	107	72	174	12	6
1914	734	135	71	321	4	0
1915	572	69	31	149	6	0
1916	557	172	50	235	12	0
	4,318	848	507	£1,630	16	0

Year.	No. of Inspections.	No. of Prosecutions	Amount of Fines and Costs.	Year.	No. of Inspections.	No. of Prosecutions.	Amount of Fines and Costs.
<i>Premises Inspected.</i>				<i>General Breaches of Act and Regulations.</i>			
			£ s. d.				£ s. d.
1909-10	802	46	94 14 6	1909-10	47	36	63 9 0
1911	929	50	235 12 0	1911	67	26	57 11 0
1912	982	88	305 1 2	1912	72	60	114 8 6
1913	2,600	93	382 7 6	1913	65	40	127 0 6
1914	3,953	152	638 15 6	1914	71	42	167 7 6
1915	3,561	71	284 9 6	1915	80	55	163 15 6
1916	4,731	95	493 1 6	1916	90	21	154 8 6
	17,558	595	£2,434 1 8		492	280	£848 0 6

Summary of Legal Proceedings.

Year.	No. of Prosecutions.	Amount of Fines and Costs.
		£ s. d.
1 Oct., 1909-31 Dec., 1910	281	1,168 13 1
1911	379	1,573 13 0
1912	439	1,693 10 8
1913	349	1,393 17 6
1914	454	1,964 18 0
1915	369	1,561 10 0
1916	371	1,457 8 0
Total	2,612	£10,813 10 3

DAIRIES SUPERVISION ACT, 1901.

CATTLE SLAUGHTERING AND DISEASED ANIMALS AND MEAT
ACT, 1902.

REPORT by the Acting Chief Veterinary Inspector upon the work of the Veterinary Branch of the Department of Public Health for the year ending 31st December, 1916.

Staff.

R. C. BELL, M.R.C.V.S. (London), Acting Chief Veterinary Inspector.

Dairy Inspectors.			District.
T. V. Blomfield	..	..	Illawarra.
E. P. Foster	..	..	Hastings and Manning River.
A. Siddins	..	..	Outside Metropolitan Area of Sydney.
W. A. Mackie	..	..	Lower Hunter River.
J. Yeo	..	..	Moss Vale.
J. G. Bocking	..	..	Upper Hunter River.
J. S. Lyons	..	..	Clarence River.
S. C. Flood	..	..	Richmond River.
J. Lacey	..	..	Quirindi to Queensland Border.
R. R. A. Faunce	..	..	Brunswick and Tweed River.
W. G. Johnston	..	..	Casino and Kyogle.
F. J. Madden	..	..	Metropolitan Area of Sydney.
V. M. Nevell	..	..	Bega and Monaro.
F. J. Page	..	..	Macleay and Nambucca Rivers.

The Dairies Supervision Act has been in force since 1886, but as originally passed at that date it was only applied to the Metropolitan Police District. In 1901 it was consolidated with Part 14 of the Public Health Act as the Dairies Supervision Act, 1901.

During the period that the Act has been in force it has been extended by proclamation to the whole of the eastern and central districts as well as most of the important inland dairying centres. The area covered by the Act now comprises the 41 municipalities in the Metropolitan Area of Sydney; 11 extra municipalities; 111 country municipalities; 74 police districts; 284 police subdistricts; the Murrumbidgee Irrigation Area, and the Hunter River Combined Sanitary Area.

It is estimated that there are 20,000 dairies in the State, over 500,000 cows in milk, and about 100,000 to 150,000 dry.

During the year 1916 the fourteen dairy inspectors travelled 70,646 miles, inspected 11,658 dairy premises, and examined 364,810 animals.

The administration of the Dairies Supervision Act is vested in the local authority of each district—in municipalities this is the Council; in places where there is no municipality, the senior police officer of the police district. His duties consist of keeping a register of all dairymen and milk-vendors, and inspecting each premises together with appliances and utensils at least four times a year. No person can sell milk or cream for profit unless his name appears on the register of the district. A Board of Health inspector visits each district in turn and accompanied by the local authority or his substitute, inspects every dairy within the district; these are not only visits of inspection, but are also advisory; these officers are all qualified stock inspectors, carefully chosen for their knowledge of dairying, and are therefore able to proffer good advice to dairymen.

At each dairy the stock are mustered and examined carefully, and any diseased animals are destroyed under police supervision. During the year 687 milch cows were destroyed for tuberculosis, 141 for actinomycosis, 102 for cancer, and 6 for other diseases.

Taking the figures already given above it will show the great need of a much larger staff of inspectors before anything like efficiency of inspection is attained. In many instances the Department receives valuable help from the police and local sanitary inspectors, but when the multifarious duties of these officers are taken into account it is easy to see that they cannot always carry out the work of inspection as they would wish. Added to this, many of the officers are not specialised in stock and dairying operations as they should be, and matters are left until the visit of the Board's Inspector. Had the Department sufficient staff to ensure a visit to each dairy twice a year, the local supervision in the meantime would in some cases perhaps be sufficient, but as it is the visits are never less than a year between, and in some cases as much as two and a half years; in fact, the whole of the western district and the rapidly-increasing dairying district in the Yanco Irrigation Area have not been inspected for three years. The only means of progression allowed to inspectors is a horse and sulky, and when it is taken into consideration that on an average they have to travel 6 miles between each dairy, it is not to be wondered at that they can only average twenty to twenty-five a week, and that out of an estimated number of 20,000 dairies only 11,650, or a little more than half, were inspected. Another great factor in the wastage of an inspector's time is the want of authority to enforce a dairyman to muster his cattle for inspection; this is noticeable in the number of cattle inspected during the year. Out of an estimated number

of 600,000 only 364,810 were inspected and 936 were found to be suffering from tuberculosis and other diseases. In one district 129 cows were destroyed for tuberculosis, and this is a district in which the inspector can only visit his dairies once in two years. The result is obvious—it is possible for a cow suffering from this disease to be in a dairy herd for two or even three periods of lactation without being discovered.

The Metropolitan Area of Sydney is inspected by one inspector. During 1916 he travelled 5,498 miles, inspected 321 dairies, examined 7,625 cows, and condemned 23 for tuberculosis, and 7 for other diseases. His only means of progression are boat, train, and tram, and more than half his time is wasted waiting to catch one or the other. If he was provided with a motor car he could easily do more than double the work.

Dairy inspectors are also authorised under the Cattle Slaughtering and Diseased Animals and Meat Act, 1902, and during their visits of inspection they visit each slaughter-house in the district. During the year 414 premises were visited and 958 animals inspected; of the latter 17 were condemned for tuberculosis and 4 for other diseases. Here again is shown the necessity for stricter and more frequent supervision. These slaughtering premises are inspected once a year by the Board's Inspector, and if they happen to be killing on that day the meat is inspected, but if no killing is taking place the premises only are inspected, as the inspector has not the time to wait for killing days. The fact that even under these circumstances 21 beasts were condemned speaks for itself.

Up to the 30th June the dairy cattle sold at Messrs. W. Inglis and Son's sale-yards were inspected by an officer of this Department, but on the 1st July the whole of the meat inspections, ante-mortem and post-mortem in the county of Cumberland, was taken over by the Metropolitan Meat Industry and Abattoirs Board. This sale is an important one so far as the Dairying Industry is concerned, inasmuch as it is essentially a sale of dairy stock, both milch and dry. It is most necessary that the Department's officers should keep in touch with all dairy cattle, and it has therefore been arranged between the Department and the Meat Board that our officers shall continue to inspect the milch cows which are sold to dairymen to go into the metropolitan dairies. Up to 30th June, 2,638 milch cows and 912 dry cows were inspected at these sales, and from 1st July 2,195 milch cows only. The necessity for this inspection is marked by the fact that, although the cows are most carefully chosen by the dealers, 17 cows were put out of the milch sale and sold as dry, to be slaughtered for meat under special inspection at the abattoirs.

On the North Coast we still retain four slaughtering inspectors and one assistant inspector at the bacon factories at Byron Bay, Lismore, Grafton, and Ballina. By a temporary arrangement these inspectors examine and brand for the Meat Board all bacon coming into the county of Cumberland.

During the early part of the year pleuro-pneumonia was very prevalent among dairy herds, but owing to the action of the Dairymen's Association in arranging for their secretary to inoculate all cows on dairy premises, it has now practically been stamped out. All the cows at the institutions under the supervision of the Board of Health have been inoculated.

Contagious mammitis is now making headway among dairy stock, and arrangements are being made to cope with this outbreak of the disease. Veterinary officers of the Meat Industry Board report large numbers of affected cows passing through Flemington sale-yards. Should the disease become prevalent a very serious state of affairs will arise as the city's supply of fresh milk will be appreciably affected.

During the early part of the year the Department suffered a severe loss in the death of the Chief Veterinary Inspector, Mr. C. J. Vyner. He had a very wide experience of Government work in New South Wales, and was connected with the inspection of stock for nearly thirty years. He had the confidence of everyone who came in contact with him in his work, and his loss will be very much felt.

In June I returned from military duties in Egypt and took up the position of Acting Chief Veterinary Inspector. During the period between Mr. Vyner's death and my return, Mr. Blomfield, Senior Dairy Inspector, undertook the duties.

During my absence since the beginning of the war the metropolitan area has been inspected by Mr. Inspector Madden, who was called in from the western district. No other change in the staff has taken place.

During the year proceedings were taken against traders as follows:—

No. of Cases.	Acts under which Proceedings were taken.	Dismissed.	With-drawn.	Fines.	Costs and Expenses.
62	Pure Food Act, 1908 ... ..	...	1	£ s. d. 105 5 0	£ s. d. 48 6 8
1	Cattle Slaughtering and Diseased Animals and Meat Act, 1902.	1	...	.....	.....
5	Dairies Supervision Act, 1901 ... ..	...	...	8 6 0	2 2 6
Total, 68		1	1	113 11 0	50 9 2

R. C. BELL,

Acting Chief Veterinary Inspector.

REPORT

REPORT OF THE CHIEF SANITARY INSPECTOR FOR THE YEAR ENDED 31st DECEMBER, 1916.

Inspectorial Staff.

Chief Inspector—	E. A. CRESSWICK, Cert. R.S.I.
Sanitary „	T. A. W. CURRY, Cert. R.S.I.
„ „	E. M. JACKSON, Cert. R.S.I.
„ „	H. M. WORMAL, Cert. R.S.I.
„ „	J. ABBERTON, Cert. R.S.I.

THE provisions of the Public Health (Amendment) Act, 1915, has been the means of effecting considerable improvement with regard to the housing of the people. Seventy-three local authorities have obtained authorisation for their sanitary inspectors to certify that any house or building within its area is unfit for habitation, and the Council may then direct that the house shall be closed until the specified repairs or alterations are carried out to their satisfaction. As it is not thought desirable by the Board to authorise inspectors under section 16, unless they hold satisfactory qualifications, many country local authorities who do not employ a qualified sanitary inspector apply to this Department for inspection of dilapidated houses and certificates to enable them to issue a closing order. This has added considerably to the work of the staff—107 dwellings in the country towns being inspected and sixty-seven certificates issued to the councils certifying that the building is unfit or unsafe for habitation or occupation, accompanied by specifications considered necessary to render it habitable where practicable. In many instances the inspecting officer's report disclosed most unsatisfactory and insanitary conditions, some of which were discovered during inspection for other purposes.

Several small outbreaks of infectious diseases occurred during the year, and investigations were made in seven country districts. A young man who was suffering from scarlet fever at a private hospital in the metropolitan area left the hospital while still infectious and visited a friend, who was enjoying a holiday with his family at a seaside resort. A young daughter of the family contracted the disease. On receipt of complaint the matter was investigated, and the young man prosecuted by the inspecting officer for exposing himself in a public place while suffering from an infectious disease, and fined £5 and 6s. costs.

As instances showing the effectiveness of enforcing sanitary measures such as efficient sanitary and garbage services, improved water supply, proper construction of closets, cleanliness of dwellings and yards, protection of food from dust and flies, storage and removal of manure and other waste matter, &c., it might be mentioned that several country towns where typhoid fever was usually prevalent in summer months are now comparatively free from that disease. Only 6 cases were notified from Cobar during the year; Gunnedah, 9; Moree, 4; Tamworth, 16.

Owing to the non-receipt of notifications of infectious diseases by the Medical Officer of Health from one of the important metropolitan councils investigation was made by the Chief Sanitary Inspector, who found that about 150 notifications received by the sanitary inspector had not been forwarded to the proper authority, inspections had not been made of infected dwellings, nor had disinfection been enforced. As this systematic neglect of duty on the part of the sanitary inspector had extended over the greater part of the year 1915, caused serious dislocation of infectious disease records kept by this Department for important statistical purposes, and possible increase of infectious disease in that and the adjoining municipalities, the Board's approval to the appointment of the sanitary inspector was withdrawn and part payment of his salary discontinued. The council being apparently unaware of the neglect, no prosecution was instituted, but a recommendation to dismiss the sanitary inspector and to appoint a qualified officer who would carry out his duty in a more conscientious manner was given effect to by the council.

With a view of inducing the residents to realise the importance of systematic destruction of flies, several local authorities are giving much publicity in their districts to the part played by house flies in spreading disease, and the measures to be taken for control and eradication of the pest. A Local Government Ordinance empowering councils to enforce measures to prevent the breeding of mosquitoes has also been gazetted.

In several country districts where infectious diseases occurred, the accommodation for patients in isolation wards became over-taxed and temporary wards were erected by the Department, or arrangements made, and the local committees assisted to provide the additional accommodation. Temporary isolation accommodation was also erected by this Department for smallpox patients at Walgett, including the necessary beds and bedding, and inspections made of the structure and cleanliness of sanitary conveniences, condition of yards, efficiency of sanitary and garbage services, &c., at Narrabri and Walgett during the smallpox outbreaks in those districts, in addition to the work of tracing contacts and supervision of disinfection. At Narrabri the local sanitary inspector refused to be vaccinated, and as his work included disinfection of infected premises he contracted smallpox. Before going to the hospital, however, and while in an infectious state with the rash well-developed, he continued to carry out his usual duties in addition to acting as ticket collector at a concert held at the Town Hall. When the matter was reported to the Board, the Chief Sanitary Inspector was instructed to prosecute, and the local council's inspector was fined £2, with 8s. costs and £3 3s. expenses, for exposing himself while suffering from an infectious disease. Another local resident who contracted smallpox and escaped from the hospital one night to visit his friends, was prosecuted on the same day and fined £1, with £2 8s. costs, on a similar charge.

Eighteen country towns were systematically inspected, and reports submitted covering general description, sanitary administration, water supply, disposal of sewage and liquid wastes, collection and disposal of nightsoil and garbage, meat and food supplies, noxious trades, cemeteries, hospitals, insanitary buildings and areas, pollution of streams, sanitary condition of hotels, infectious diseases, and disinfection and vital statistics. Full recommendations for dealing with any breaches of the Acts or Local Government Ordinances were attached to each report and forwarded to the local authorities for the necessary action. Fourteen re-inspections were made of country towns to ascertain if recommendations were complied with.

One hundred and seven inspections of proclaimed areas and unhealthy lands were made. Four existing proclamations were revoked, and six draft proclamations and plans of unhealthy areas were prepared for submission.

The pamphlet "Sanitation of Hotels," issued for the information of local authorities, police, and publicans, was forwarded to each authority, and to every hotel licensee in the State, but owing to some misconception of what referred to new or to old premises it was found necessary to issue a supplementary circular. Copies of the publication known as "Simple Aids to Sanitation," illustrating by diagram and description the sanitary appliances recommended, were also forwarded to each local authority and licensing inspector.

Three hundred and thirty-nine hotels were inspected during the year, when it was found that considerable improvement had resulted from the issue of the above publications.

One hundred and ninety inspections of picture shows were made to ascertain whether the regulations regarding cleanliness, sanitary conveniences, and disinfection are carried out.

Thirteen samples of drainage, flock, 6; disinfectants, 9; oysters, 1, were collected and submitted for analysis.

Inspections were also made and reports submitted on the following matters, viz.:—Proposed sites for nightsoil depôts, 42; existing nightsoil depôts, 30; garbage depôts and proposed sites for same, 20; noxious trade premises in county of Cumberland and country, 542; proposed noxious trade area at Bankstown, 2; cemeteries, 4; nuisances, 78; glassworks, 15; public laundries, 12; Government buildings, 10; complaints of nuisance from garbage destructors, 23; septic tanks and proposed sites for same, 31; disposal of drainage in bacon factories, 5; pollution of foreshores by sewage, 5; alleged pollution of water supplies in country, 5; slaughtering premises and dairies, Western Division, 11; railway camps, 6; nightsoil desiccators, 3.

Inspecting officers attended the Supreme Court to give evidence in actions for or against local authorities regarding public health matters on ten occasions, and as witnesses in twelve police court prosecutions.

The number of rats caught on the wharves by this Department's staff of three rat-catchers, one of whom was ill for a considerable time, was 1,778; City Council's staff of six rat-catchers, 4,761; Harbour Trust, one rat-catcher, 415. Rats from fumigated ships and similar sources, 989; total, 7,943. All rats caught were examined at the Microbiological Laboratory, and none found infected with plague.

Noxious Trades Act.—There are now 577 persons licensed under this Act, many of the licensees holding two or more licenses, as, for instance, pig-keepers and poultry-farmers, bone-boilers and fat-extractors, &c. Tables are appended showing the nature and situation of noxious trades premises and the efficiency of the supervision by the local authority for the district. The premises are also inspected from time to time by departmental officers.

TABLE showing the number of Licensed Noxious Trades Premises in each Municipality and Shire within the County of Cumberland.

District.	Fat-extractor.	Fat-melter.	Bone-boiler.	Bone-grinder.	Glue-maker.	Pig-keeper.	Poultry-farmer.	Gut-scraper.	Knacker.	Rag-dealer.	Rag-picker.	Flock-maker.	Manure-maker.	Wool-scourer.	Total Number Licensed.	Efficiency of Supervision by Local Authority.
Municipalities—																
Sydney.....	...	...	...	...	...	...	...	...	...	1	2	...	...	...	3	Fair.
Alexandria.....	11	...	5	5	2	4	4	...	3	...	5	1	5	1	19	"
Auburn.....	1	...	...	...	...	1	2	...	...	...	...	...	...	...	4	"
Bankstown.....	...	...	...	...	...	23	29	12	12	...	...	...	...	...	32	"
Bexley.....	...	...	...	...	...	3	12	...	...	...	...	...	...	...	5	"
Botany.....	3	...	...	1	...	17	27	...	...	...	...	...	1	10	41	"
Campbelltown.....	2	...	...	...	...	2	...	...	...	...	...	...	...	...	4	"
Canterbury.....	2	...	...	...	...	10	11	...	...	...	...	...	...	...	16	"
Eastwood.....	2	...	...	...	...	3	2	...	...	...	...	...	...	...	5	"
Enfield.....	1	...	...	...	...	2	...	...	...	...	...	...	...	...	3	"
Globo.....	...	...	...	...	...	...	...	...	...	...	1	1	...	...	2	"
Granville.....	1	...	...	...	...	2	2	1	...	...	1	...	1	...	7	"
Hurstville.....	...	...	...	...	...	1	...	...	...	...	...	...	...	...	1	"
Kogarah.....	...	...	...	...	...	2	2	...	...	...	...	...	...	...	2	Good.
Lano Covo.....	...	...	...	...	...	1	...	...	...	...	...	...	...	...	1	"
Lidcombo.....	1	...	...	...	...	1	...	...	...	...	...	...	1	...	2	Fair.
Leichhardt.....	...	1	...	...	...	...	...	...	...	...	5	...	...	...	6	Good.
Liverpool.....	3	...	...	...	...	6	...	1	...	...	...	...	...	1	11	Poor.
Manly.....	...	...	...	...	...	...	1	...	...	...	...	...	...	...	1	Good.
Marrickville.....	...	1	...	...	...	...	...	...	...	...	...	...	...	2	3	"
Mascot.....	2	...	1	1	...	9	12	...	...	...	...	...	1	...	15	"
Parramatta.....	2	...	...	...	...	1	...	...	...	...	...	...	...	...	1	"
Penrith.....	2	...	...	...	...	2	...	...	...	...	...	...	...	...	4	Fair.
Pottersham.....	...	...	...	...	...	...	...	...	...	...	1	...	...	...	1	Good.
Prospect.....	3	...	...	...	...	4	...	...	...	...	...	...	...	...	7	"
Randwick.....	...	...	...	...	...	2	4	...	...	1	...	...	...	1	6	"
Redfern.....	...	...	...	...	...	...	...	...	...	...	2	...	...	...	2	"
Richmond.....	4	...	...	...	...	4	...	...	...	...	...	...	...	...	8	"
Rockdale.....	1	...	...	...	...	6	10	...	...	...	...	...	...	...	11	"
St. Peters.....	...	...	...	...	...	1	...	...	...	...	1	...	...	...	2	"
St. Marys.....	5	...	...	...	...	3	...	...	...	...	...	...	...	...	8	Fair.
Smithfield.....	...	...	...	...	...	1	...	...	...	...	...	...	...	1	2	"
Waterloo.....	1	...	...	...	...	...	...	...	...	...	...	1	...	...	2	Good.
Waverley.....	...	...	...	...	...	3	4	...	...	...	...	...	...	...	4	"
Willoughby.....	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	Fair.
Windsor.....	2	...	...	...	...	1	...	1	...	...	...	...	...	...	4	Fair.
Shires—																
Baulkham Hills.....	1	...	...	...	...	3	...	...	...	...	...	...	...	1	5	Fair.
Blacktown.....	4	...	...	...	...	2	...	...	...	...	...	...	...	...	6	"
Bulli.....	6	...	...	...	...	3	1	...	...	...	...	...	...	...	10	Good.
Hornsby.....	3	...	...	...	...	3	...	...	...	...	...	...	...	...	6	"
Kuring-gai.....	2	...	...	...	...	8	2	...	...	...	...	...	...	...	10	"
Nepean.....	3	...	...	...	...	3	...	...	...	...	...	...	...	...	6	Fair.
Sutherland.....	3	...	...	...	...	4	...	...	...	...	...	...	...	...	7	"
Warringah.....	2	...	...	...	...	5	10	...	...	...	...	...	...	...	13	Good.
Wollondilly.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	"
	71	2	6	7	2	146	125	5	5	2	18	3	10	17	309	

TABLE showing the number of Licensed Noxious Trades Premises within the Hunter River Combined Sanitary District.

Municipalities—																
Adamstown.....	1	...	...	...	...	2	...	...	...	...	...	...	...	...	3	Fair.
Carrington.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	"
Greta.....	1	...	...	...	...	1	...	...	...	...	...	...	...	...	2	"
Hamilton.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	"
Maitland West.....	1	...	...	...	...	1	...	...	...	...	...	...	...	...	2	"
Merowether.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	"
New Lambton.....	2	...	...	...	...	3	2	...	...	...	...	...	...	...	7	"
Waratah.....	1	...	...	...	...	2	...	...	...	...	...	...	...	...	3	"
Wickham.....	...	...	...	...	...	...	...	...	...	1	...	...	...	...	1	"
Wallsend.....	2	...	...	...	...	3	...	...	...	...	...	...	...	...	5	"
Shires—																
Bolwarra.....	4	...	...	...	...	4	...	...	...	...	...	...	...	...	8	"
Cessnock.....	24	...	...	...	...	24	...	...	...	...	...	...	...	...	48	"
Lake Macquarie.....	12	...	...	...	...	12	...	...	...	...	...	...	...	...	24	"
Port Stephens.....	5	...	...	...	...	5	...	...	...	...	...	...	...	...	10	"
Tarro.....	15	...	...	...	...	13	...	...	...	...	...	...	...	...	28	"
Number Licensed	68	...	...	...	...	70	2	...	...	...	1	...	...	...	141	

TABLE showing the Number of Licensed Noxious Trades Premises in Municipalities and Shires in other parts of the State to which the Act has been extended.

District.	Fat-extractor.	Fat-melter.	Bone-boiler.	Bone-grinder.	Glue-maker.	Pig-keeper.	Poultry-farmer.	Gut-scraper.	Knacker.	Rag-dealer.	Rag-picker.	Flock-maker.	Manure-maker.	Wool-scourer.	Total Number Licensed.	Efficiency of Supervision by Local Authority.
Municipalities—																
Broken Hill	2	...	...	...	...	16	1	...	...	...	...	...	...	...	18	Fair.
Casino	3	...	...	...	...	12	...	...	...	...	...	...	...	...	5	"
Cobar	12	...	...	...	...	12	...	...	...	...	...	...	...	...	4	"
Coonamble.....	2	...	...	...	...	2	...	...	...	...	...	...	...	...	4	"
Dungog	3	...	...	...	...	3	...	...	...	...	...	...	...	...	6	"
Goulburn .....	...	...	...	...	...	1	...	...	...	...	...	...	...	...	1	"
Inverell	3	...	...	...	...	6	...	...	...	...	...	...	...	...	9	"
Lismore.....	3	...	...	...	...	...	...	...	...	...	...	...	...	...	3	Good.
Moree	3	...	...	...	...	3	...	...	...	...	...	...	...	...	6	Fair.
Murwillumbah	1	...	...	...	...	1	...	...	...	...	...	...	...	...	2	"
North Illawarra.....	6	...	...	...	...	6	...	...	...	...	...	...	...	...	12	"
Tamworth .....	...	...	...	...	...	1	...	...	...	...	...	...	...	...	1	Good.
Ulmara	1	...	...	...	...	...	...	...	...	...	...	...	...	...	1	Fair.
Wagga .....	...	...	...	...	...	2	...	...	...	...	...	...	...	...	2	Good.
Shires—																
Blaxland.....	10	...	...	...	...	11	...	...	...	...	...	...	...	...	21	"
Muswellbrook	3	...	...	...	...	3	...	...	...	...	...	...	...	...	6	Fair.
Tweed	12	...	...	...	...	12	1	...	2	...	...	...	...	...	26	"
	54	...	...	...	...	71	2	...	2	...	...	...	...	...	127	
Total in State	193	2	6	7	2	237	129	5	7	2	19	3	10	17	577	

PROSECUTIONS for Breaches of Regulations governing Noxious Trades.

Date.	District.	Prosecutor.	Nature of Trade.	Trader's Name.	Offence.	Fine and Costs.
1916.						£ s. d.
16 March	Alexandria	Local Authority	Fat Extractor ...	D.F.S.	Reg. 10A	7 8 0
7 June	Granville	" "	Knacker.....	J.B.	" 6D	3 15 0
4 July.....	Eastwood	" "	Pig Keeper	C.D. Ltd. ..	Ord. 37, Sec. 3	17 5 0
14 August	Granville	" "	Knacker.....	J.B.	Act 82 " 13	20 0 0
24 October	Mascot	" "	Pig Keeper	G.G.	Ord. 37 " 28	2 8 0
4 December ...	Granville	" "	Knacker.....	J.B.	Act 82 " 13	25 0 0
3 July.....	Liverpool	" "	Pig Keeper	W.T.....	" 82 " 13	1 6 0

BREACHES of other Acts and Regulations.

Date.	Districts.	Prosecutor.	Name.	Offence.	Fine and Costs.
1916.					£ s. d.
9 November ...	Narrabri	Local Authority	J.H.....	Act 30, Sec. 42	5 11 0
9 "	"	" "	H.B.	" 30 " 42	3 11 0
2 March	Sydney.....	" "	C.B.	" 30 " 42	5 6 0

E. A. CRESSWICK,
Chief Sanitary Inspector.

PRIVATE HOSPITALS ACT, 1908.

REPORT ON THE OPERATION OF THE ACT FOR THE YEAR ENDED 31ST DECEMBER, 1916, BY DR. A. T. CHAPPLE, ASSISTANT MEDICAL OFFICER OF THE GOVERNMENT.

THE Private Hospitals Act came into force on 14th December, 1908, but active operations were deferred until regulations had been framed. These were published in the *Government Gazette* No. 120 of 8th September, 1909, and took effect from 15th October of that year.

The Act was passed in order to control efficiently private hospitals throughout the State, but more particularly to have thorough supervision over the hospitals in which attention is chiefly confined to maternity cases. No private hospital is now allowed to be carried on until there has been a proper inspection of the premises and investigations made as to the suitability of the proposed licensee and resident manager. All private hospitals throughout the State are subject to inspection at all times by an officer authorised by the Board of Health.

When this Act first came into operation it was recognised by the Board that a certain amount of consideration had to be given to persons who had conducted such an establishment for perhaps many years prior to the passing of the Act; but since 1st July, 1910, the Department insists that as far as possible premises shall be structurally suitable, and that the resident managers shall comply with the requirements as to personal qualifications.

During this year owing to the scarcity of Trained Nurses arrangements slightly less strict have been made in order that hospitals already established shall be conducted under the circumstances as efficiently as possible. These arrangements are only temporary, and as soon as possible reversion will be made to pre-war conditions.

During the year ended 31st December, 1916, 140 applications for new licenses have been received, of which 49 came from Sydney and environs (*see* Appendix Table I), and 91 from the remainder of the State (*see* Appendix Table II).

The number of applications received show an increase of 36 compared with the previous year.

The Police were frequently called upon to inspect hospitals and submit information concerning them in accordance with a detailed report supplied by this Department, pending a visit from a medical officer of the staff. The thanks of the Department are due to the Inspector-General of Police and to the officers under his control throughout the State for their able assistance in the administration of the Act. In the metropolitan area many of the hospitals have been inspected, and also those in some country towns when opportunity offered.

APPLICATIONS for License—How dealt with—Comments.

	Sydney and Environs.	Country.	Total for New South Wales.
Applications received	49	91	140
„ refused	5	22	27
„ withdrawn	5	17	22
Licenses issued, 1916	38	52	90
„ withdrawn	12	28	40
„ cancelled .....	...	...	...

Exemptions Granted.—Exemption was granted in the following instances, namely:—Nurses Mathers, Mitchell, and Aughtie, Tumbaramba; Nurse Smith, Rye Park; Nurse Rouse, Goodooga; Nurse Todd, Wiseman's Creek; Nurse Cumming, Wentworth; Nurse Bowden, Wilcannia. Total, eight; a decrease of three as compared with the number in 1915.

Legal proceedings were taken in five instances for breaches of the Act, with the undermentioned results, namely:—

Henty—E. Mulloy, fined £10.

Dubbo—I. Furney, case dismissed.

Wauchope—E. Wilks, case dismissed.

Forbes—M. McLean, fined £10.

Forbes—A. C. Morris, fined £10.

Licenses in Existence on 31st December, 1916.—Sydney and environs, 173; remainder of New South Wales, 382; total for the State, 555. This is an increase of 18 on the total in existence on 31st December, 1915. Sydney showed an increase of 11, and country districts an increase of 7. Details of the summary are given in Tables III and IV.

Applications Refused.—Refusal of applications has been principally due to the fact that the proposed resident manager has been unable to submit certificates of training from recognised Maternity and other Hospital Training Schools. In a few instances applications were refused because the characters of the applicants were not wholly above reproach, and sometimes because the accommodation provided for persons resident other than patients was inadequate.

Applications

Applications Withdrawn.—It frequently happened that when applicants were informed that the resident managers nominated by them were not eligible or that the premises were unsuitable the applications were withdrawn.

Licenses Relinquished.—In a very few cases death has been the cause, but the majority was due to change of residence or disposal of the hospital to another person.

Licenses Recalled.—It is satisfactory to report that in no instance has it been necessary to recall a license during the currency of the license.

CLASSIFICATION of Private Hospitals Licensed in New South Wales.

	Sydney.	Country.	Total.
Hospitals receiving medical, surgical, and lying-in cases	49	124	173
„ medical and surgical cases	8	12	20
„ lying in cases only	116	246	362
Hospitals containing 1 bed	19	40	59
„ 2 beds	28	89	117
„ 3 „	22	67	89
„ 4-5 beds	50	77	127
„ 6-10 „	53	80	133
„ 11-20 „	18	28	46
„ over 20 „	23	1	24

The distribution of the hospitals is indicated in detail in the Appendix Tables II and III.

Comments.—65·2 per cent. of all the private hospitals in the State are licensed to receive lying-in cases only, being an increase of 0·8 per cent. on the previous year. Of private hospitals licensed in Sydney and environs 67 per cent. are lying-in hospitals and in the country 64·4 per cent.

Qualifications of Licensees and Resident Managers.—Of private hospitals conducted in the State 520 are conducted by licensees who are also resident managers (160 in Sydney and 360 in country districts), and the remainder (35) are those in which the licensee has appointed a resident manager other than himself or herself (13 in Sydney and 22 in country districts).

Qualifications of Licensees.

	Sydney.	Country.
Legally qualified medical practitioners	7	28
Certificated nurses	153	189
Uncertificated persons	13	165

Qualifications of Resident Managers.

	Sydney.	Country.
Legally qualified medical practitioners	2	15
Qualified for approval under section 10a	6	9
„ „ „ „ 10b	70	70
„ „ „ „ 10c	33	41
„ „ „ „ 10d	62	247

For details of summary *vide* Appendix Tables V and VI.

Comments.—Of 309 resident managers approved under section 10 (d) (62 in Sydney and 247 in country districts) 137 are trained nurses and 172 are untrained (10 in Sydney and 162 in country) persons, *i.e.*, who do not possess any hospital certificate at all.

Comments on certain Sections and Regulations under the Act.

Section II.—Under this section the following notifiable diseases were reported from licensed hospitals:—

1. Diphtheria—Campbelltown, 1; Chatswood, 3; Coraki, 1; Canowindra, 6; Darlinghurst, 2; Dubbo, 1; Lismore, 1; Manly, 2; Mosman, 2; North Sydney, 15; Summer Hill 1. Total, 35 cases.
2. Erysipelas—None.
3. Measles—Chatswood, 2; Gilgandra, 1; Inverell, 1; North Sydney, 2. Total, 6 cases.
4. Scarlet Fever—Manly, 2; Moombooldool, 1; Narrandera, 1; North Sydney, 4; Summer Hill, 2; Warren, 1. Total, 11 cases.
5. Puerperal Septicæmia—Lewisham, 1; Moree, 1; Ryde, 1. Total, 3 cases.

Hospitals in which a septic puerperal case has occurred are prohibited from receiving any additional lying-in case, pending the enforcement of certain regulations; as a consequence, no second case was infected in any hospital.

Section 12.—This section provides that all births and deaths which occur in private hospitals must be reported within twenty-four hours. Further, in compliance with the definition of birth, all miscarriages or still-births are reported. During this year the number of still-births and miscarriages reported from private hospitals total 208 cases.

TABLE I.—Summary of Applications for License under Private Hospitals Act (Sydney and environs), 1916—*continued*.

District.	Applications.				Licenses.			
	No. received.	No. refused.	No. withdrawn.	No. not dealt with.	No. issued.	No. withdrawn.	No. cancelled.	No. existing.
Randwick .....	...	...	...	...	...	...	...	4
Redfern .....	...	...	...	...	...	...	...	3
Rockdale .....	...	...	...	...	...	...	...	3
Rose Bay .....	...	...	...	...	...	...	...	2
Roseville	1	...	...	...	1	...	...	1
Rozelle	2	...	...	...	2	...	...	2
Ryde	1	...	...	...	1	...	...	2
Stanmore	1	...	1	...	...	...	...	2
Summer Hill .....	...	...	...	...	...	...	...	2
Sydney	3	...	1	...	2	...	...	2
Wahroonga .....	...	...	...	...	...	...	...	1
Waitara .....	...	...	...	...	...	...	...	1
Waverley	5	...	...	...	5	2	...	10
Willoughby	1	...	...	...	...	...	...	1
Woollahra .....	...	...	...	...	...	...	...	3
Total	49	5	5	...	38	12	...	173

TABLE II.—Summary of Applications for License under Private Hospitals Act, New South Wales (Sydney and environs excepted), 1916.

District.	Applications.				Licenses.			
	No. received.	No. refused.	No. withdrawn.	No. not dealt with.	No. issued.	No. withdrawn.	No. cancelled.	No. existing.
Aberdare	1	1	...	...	...	...	...	...
Abermain .....	...	...	...	...	...	...	...	1
Adamstown .....	...	...	...	...	...	...	...	1
Adelong .....	...	...	...	...	...	1	...	1
Albury .....	...	...	...	...	...	...	...	4
Ardlethan	1	...	1	...	...	...	...	...
Armidale .....	...	...	...	...	...	...	...	4
Ballina .....	...	...	...	...	...	...	...	1
Balranald .....	...	...	...	...	...	...	...	3
Bangalow .....	...	...	...	...	...	...	...	2
Barmedman .....	...	...	...	...	...	...	...	1
Barraba .....	...	...	...	...	...	...	...	1
Bathurst	1	...	...	...	1	1	...	5
Bega	2	1	1	...	...	...	...	1
Bellingen .....	...	...	...	...	...	...	...	1
Berrigan .....	...	...	...	...	...	...	...	1
Bingara	1	1	...	...	...	...	...	1
Blackheath	1	...	...	...	1	...	...	2
Blayney .....	...	...	...	...	...	...	...	2
Bogan Gate .....	...	...	...	...	...	...	...	1
Boggabri	1	...	...	...	1	...	...	2
Bomaderry .....	...	...	...	...	...	...	...	1
Bombala	4	...	1	...	3	1	...	3
Bourke .....	...	...	...	...	...	1	...	1
Bowral	1	...	...	...	1	...	...	1
Bowraville	1	1	...	...	...	...	...	1
Braidwood .....	...	...	...	...	...	...	...	1
Broken Hill .....	...	...	...	...	...	1	...	2
Brooklyn .....	...	...	...	...	...	...	...	1
Brushgrove .....	...	...	...	...	...	...	...	1
Burrowa	1	1	...	...	...	...	...	1
Byangum .....	...	...	...	...	...	...	...	1
Byron Bay .....	...	...	...	...	...	...	...	...
Camden	1	...	...	...	1	...	...	2
Campbelltown .....	...	...	...	...	...	...	...	2
Canbelego	1	...	...	...	1	...	...	1
Candelo	1	...	...	...	1	1	...	1
Canowindra	1	...	...	...	1	1	...	1
Carcoar .....	...	...	...	...	...	...	...	1
Carrington	1	...	...	...	1	...	...	1
Casino .....	...	...	...	...	...	...	...	4
Cessnock .....	...	...	...	...	...	...	...	1
Cobar .....	...	...	...	...	...	...	...	...
Coff's Harbour .....	...	...	...	...	...	...	...	1
Coledale .....	...	...	...	...	...	...	...	1
Condobolin	2	1	1	...	...	...	...	1
Coolamon	2	1	...	...	1	1	...	1

TABLE II.—Summary of Applications for License under Private Hospitals Act, New South Wales (Sydney and environs excepted), 1916—*continued*.

District.	Applications.				Licenses.			
	No. received.	No. refused.	No. withdrawn.	No. not dealt with.	No. issued.	No. withdrawn.	No. cancelled.	No. existing.
Cooma	1	...	...	...	1	1	...	2
Coonabarabran.....	...	...	...	...	...	...	...	12
Coonamble .....	...	...	...	...	...	...	...	1
Cootamundra.....	...	...	...	...	...	1	...	3
Coraki	1	...	...	...	1	...	...	3
Corowa	2	...	...	...	2	...	...	12
Cowra.....	...	...	...	...	...	...	...	3
Cronulla	1	1	...	...	...	1	...	...
Crookwell .....	...	...	...	...	...	...	...	3
Culcairn.....	...	...	...	...	...	...	...	2
Cumnock .....	...	...	...	...	...	...	...	1
Dapto.....	...	...	...	...	...	...	...	1
Delegate .....	...	...	...	...	...	...	...	2
Deniliquin	1	...	...	...	1	...	...	3
Denman	1	...	...	...	1	...	...	1
Dorrigo	2	...	1	...	1	...	...	2
Dubbo	1	1	...	...	...	1	...	7
Dungog	4	2	...	...	2	...	...	4
Emmaville.....	...	...	...	...	...	...	...	1
Finley	1	...	...	...	1	...	...	1
Forbes .....	...	...	...	...	...	...	...	2
Ganmain	1	...	...	...	1	...	...	2
Gilgandra	1	...	...	...	1	1	...	1
Glen Ellen.....	...	...	...	...	...	...	...	1
Glen Innes.....	2	...	1	...	1	...	...	5
Gloucester	2	1	...	...	1	...	...	1
Goulburn	3	2	...	...	1	...	...	7
Grafton .....	...	...	...	...	...	2	...	8
Grenfell.....	1	1	...	...	...	...	...	2
Gulgong.....	...	...	...	...	...	...	...	1
Gundagai.....	...	...	...	...	...	...	...	3
Gunnedah.....	...	...	...	...	...	1	...	2
Gunning.....	2	...	1	...	1	1	...	1
Guyra.....	1	...	...	...	1	...	...	2
Hay.....	...	...	...	...	...	1	...	4
Henty	2	1	1	...	...	...	...	2
Holbrook .....	...	...	...	...	...	...	...	1
Inverell.....	1	...	...	...	1	1	...	7
Jerilderio	1	1	...	...	...	...	...	1
Junee .....	...	...	...	...	...	...	...	2
Katoomba.....	...	...	...	...	...	...	...	2
Kempsey.....	...	...	...	...	...	1	...	3
Kurri Kurri .....	...	...	...	...	...	...	...	1
Kyogle	1	...	...	...	1	...	...	1
Lake Cudgellico .....	...	...	...	...	...	...	...	2
Lawson .....	...	...	...	...	...	...	...	1
Leeton .....	...	...	...	...	...	...	...	1
Leura .....	...	...	...	...	...	...	...	1
Lismore	1	...	1	...	1	1	...	10
Lithgow.....	...	...	...	...	...	...	...	2
Liverpool.....	...	...	...	...	...	...	...	2
Lockhart	1	...	...	...	1	1	...	3
Macksville	1	...	...	...	1	...	...	3
Maclean	3	1	...	...	2	...	...	3
Maitland.....	1	...	...	...	1	...	...	7
Manildra.....	...	...	...	...	...	1	...	1
Manilla .....	...	...	...	...	...	...	...	3
Mayfield.....	3	...	...	...	3	...	...	3
Merriwa .....	...	...	...	...	...	...	...	1
Millthorpe	3	...	1	...	2	...	...	2
Milton.....	1	1	...	...	...	...	...	1
Molong.....	1	...	...	...	1	...	...	2
Moree.....	...	...	...	...	...	...	...	3
Morpeth .....	...	...	...	...	...	...	...	1
Mortdale.....	1	...	...	...	1	...	...	1
Moruya	1	...	...	...	1	1	...	1
Moss Vale	2	...	...	...	2	1	...	4
Mudgee .....	...	...	...	...	...	...	...	5
Mullumbimby .....	...	...	...	...	...	...	...	2
Mungindi .....	...	...	...	...	...	...	...	1
Murrumburrah	1	1	...	...	...	...	...	1
Murrurundi .....	...	...	...	...	...	1	...	...
Murwillumbah	2	1	1	...	...	1	...	6
Muswellbrook .....	...	...	...	...	...	...	...	2
Nabiac	1	...	...	...	1	1	...	2
Narrabri	1	...	...	...	1	...	...	3
Narrandera	1	1	...	...	...	...	...	2
Narromino	2	...	1	...	1	1	...	2
Newcastle .....	...	...	...	...	...	...	...	3
Nowra.....	1	...	...	...	1	1	...	3

TABLE II.—Summary of Applications for License under Private Hospitals Act, New South Wales (Sydney and environs excepted), 1916—*continued*.

District.	Applications.				Licenses.			
	No. received.	No. refused.	No. withdrawn.	No. not dealt with.	No. issued.	No. withdrawn.	No. cancelled.	No. existing.
Nyngan.....	1	...	...	...	...	...	...	2
Oberon.....	1	1	...	...	1	...	...	1
Orange.....	1	...	1	...	1	1	...	7
Pambula.....	...	...	...	...	...	...	...	1
Parkes.....	1	...	1	...	1	1	...	7
Parramatta .....	...	...	...	...	...	...	...	3
Peak Hill.....	1	...	...	...	1	...	...	2
Pictou .....	...	...	...	...	...	...	...	1
Portland	1	...	...	...	1	...	...	1
Port Macquarie	1	...	1	...	...	...	...	1
Queanbeyan .....	...	...	...	...	...	...	...	2
Quirindi.....	...	...	...	...	...	...	...	4
Richmond .....	...	...	...	...	...	...	...	2
Rylstone.....	1	...	...	...	1	...	...	2
Scone .....	...	...	...	...	...	...	...	4
Singleton	1	...	...	...	1	1	...	5
St. Mary's	1	...	...	...	1	...	...	1
Stroud .....	...	...	...	...	...	1	...	...
Tamworth	1	...	...	...	1	1	...	7
Taree.....	...	...	...	...	...	...	...	2
Temora	1	...	...	...	1	...	...	8
Tenterfield.....	1	...	...	...	1	...	...	2
Tinonee.....	...	...	...	...	...	...	...	1
Tocumwal	1	...	...	...	1	...	...	2
Trangie .....	...	...	...	...	...	...	...	2
Trundle.....	...	...	...	...	...	...	...	1
Tumut .....	...	...	...	...	...	...	...	2
Tuncurry .....	...	...	...	...	...	...	...	1
Tweed Heads.....	1	...	...	...	1	1	...	1
Uralla.....	2	...	1	...	1	1	...	2
Urana.....	1	...	...	...	1	...	...	1
Urunga .....	...	...	...	...	...	...	...	1
Wagga Wagga	1	1	...	...	1	1	...	7
Warialda .....	...	...	...	...	...	...	...	1
Walcha	1	...	...	...	1	1	...	1
Warren	1	1	...	...	...	...	...	3
Wauchope	1	...	1	...	...	...	...	1
Wee Waa .....	...	...	...	...	...	1	...	1
Wellington	1	...	...	...	1	1	...	3
Wentworth Falls .....	...	...	...	...	...	...	...	...
Werris Creek	1	...	1	...	...	...	...	...
Whitton	1	...	...	...	1	...	...	1
Wingham	1	...	...	...	1	...	...	2
Wollongong.....	1	1	...	...	1	1	...	3
Woonona	1	...	...	...	1	...	...	2
Wyalong.....	1	1	...	...	...	1	...	4
Wyang .....	...	...	...	...	...	...	...	1
Yass	1	...	...	...	1	...	...	3
Young.....	1	...	...	...	1	2	...	6
Total	91	22	17	...	52	28	...	382

TABLE III.—Nature of Private Hospitals Licensed in Sydney and environs, 1916.

District.	Licenses held.	Medical, Surgical, and Lying-in.	Medical and Surgical.	Lying-in.	Beds.						
					1	2	3	4-5	6-10	11-20	Over 20.
Annandale	3	.....	.....	3	1	...	1	1	...	...	...
Arncliffe	2	1	.....	1	...	1	...	...	1	...	...
Ashfield	4	1	.....	3	...	2	...	1	1	...	...
Auburn	3	1	.....	2	...	1	1	1	...	...	...
Balmain	3	.....	.....	3	...	...	3	...	...	...	...
Bankstown	1	.....	.....	1	...	1	...	...	...	...	...
Bondi	2	.....	.....	2	...	1	...	1	...	...	...
Burwood	4	1	.....	3	...	...	1	1	1	...	1
Campsie	1	.....	.....	1	...	...	...	1	...	...	...
Carlton	1	.....	.....	1	...	1	...	...	...	...	...
Chatswood	3	1	.....	2	...	...	1	...	1	1	...
Concord.....	1	.....	.....	1	1	...	...	...	...	...	...
Darlinghurst.....	10	8	1	1	...	...	...	1	...	...	9
Darlington	1	.....	.....	1	1	...	...	...	...	...	...
Drummoyne	3	1	.....	2	...	1	1	...	...	...	1
Dulwich Hill	5	2	.....	3	...	1	...	1	3	...	...
Eastwood.....	1	1	.....	...	...	...	...	...	1	...	...
Enmore	4	.....	.....	4	...	3	...	...	1	...	...

TABLE III.—Nature of Private Hospitals Licensed in Sydney and environs—*contd.*

District.	Licenses held.	Medical, Surgical, and Lying-in.	Medical and Surgical.	Lying-in.	Beds.						
					1	2	3	4-5	6-10	11-20	Over 20.
Five Dock.....	1	.....	.....	1	...	...	...	1	...	...	...
Forest Lodge.....	3	.....	.....	3	...	3	...	...	...	...	...
Gladesville.....	3	.....	1	2	1	1	...	...	1	...	...
Glebe.....	4	1	.....	3	...	...	...	1	2	1	...
Gore Hill.....	1	.....	.....	1	...	1	...	...	...	...	...
Granville.....	1	.....	.....	1	1	...	...	...	...	...	...
Haberfield.....	2	.....	.....	2	...	...	...	2	...	...	...
Hornsby.....	1	.....	.....	1	1	...	...	...	...	...	...
Hunter's Hill.....	2	1	1	...	...	...	...	1	...	...	1
Kensington.....	6	.....	.....	6	1	2	...	2	1	...	...
Killara.....	1	1	.....	...	...	...	...	...	...	1	...
Kogarah.....	1	1	.....	...	...	...	...	...	...	1	...
Leichhardt.....	4	1	.....	3	3	...	...	...	...	1	...
Lewisham.....	1	.....	.....	1	1	...	...	...	...	...	...
Lidcombe.....	1	.....	.....	1	...	...	...	...	1	...	...
Manly.....	7	5	.....	2	...	...	2	...	2	3	...
Marrickville.....	8	.....	1	7	1	1	1	2	2	1	...
Mosman.....	4	2	.....	2	...	...	1	1	1	...	1
Neutral Bay.....	5	3	.....	2	...	...	1	...	2	2	...
Nowtown.....	2	.....	.....	2	...	...	1	...	1	...	...
North Sydney.....	9	4	1	4	...	1	...	2	2	3	1
Paddington.....	6	1	1	4	...	...	2	2	...	1	1
Pennant Hills.....	1	.....	1	...	...	...	...	...	...	...	...
Petersham.....	6	1	1	4	1	1	1	1	1	...	1
Potts Point.....	1	1	.....	...	...	...	...	...	...	...	1
Pymont.....	1	.....	.....	1	1	...	...	...	...	...	...
Randwick.....	4	2	.....	2	...	2	...	...	...	...	2
Redfern.....	3	1	.....	2	1	...	...	...	1	1	...
Rockdale.....	3	.....	.....	3	...	2	...	1	...	...	...
Rose Bay.....	2	.....	.....	2	1	...	...	1	...	...	...
Roseville.....	1	.....	.....	1	...	...	...	...	1	...	...
Rozello.....	2	.....	.....	2	1	...	1	...	...	...	...
Ryde.....	2	.....	.....	2	...	...	1	...	1	...	...
Stanmore.....	2	1	.....	1	...	...	...	1	...	...	1
Summer Hill.....	2	1	.....	1	...	...	...	...	1	...	1
Sydney.....	2	2	.....	...	...	...	...	...	1	...	1
Wahroonga.....	1	1	.....	...	...	...	...	...	...	...	1
Waitara.....	1	.....	.....	1	1	...	...	...	...	...	...
Waverley.....	10	1	.....	9	1	1	2	3	2	1	...
Woollahra.....	3	1	.....	2	...	1	...	...	1	1	...
Willoughby.....	1	.....	.....	1	...	...	1	...	...	...	...
Total.....	173	49	8	116	19	28	22	30	33	18	23

TABLE IV.—Nature of Private Hospitals Licensed in New South Wales (Sydney and environs excepted), 1916.

District.	Licenses held.	Medical, Surgical, and Lying-in.	Medical and Surgical.	Lying-in.	Beds.						
					1	2	3	4-5	6-10	11-20	Over 20.
Abermain.....	1	.....	.....	1	1	...	...	...	...	...	...
Adamstown.....	1	.....	.....	1	...	1	...	...	...	...	...
Adelong.....	1	.....	.....	1	...	...	1	...	...	...	...
Albury.....	4	4	.....	...	...	...	...	...	3	1	...
Armidale.....	4	1	.....	3	...	1	1	1	...	1	...
Ballina.....	1	1	.....	...	...	...	...	...	1	...	...
Balranald.....	3	.....	.....	3	1	1	1	...	...	...	...
Bangalow.....	2	2	.....	...	...	...	...	1	1	...	...
Barnedman.....	1	1	.....	...	...	...	1	...	...	...	...
Barraba.....	1	.....	.....	1	...	...	1	...	...	...	...
Bathurst.....	5	1	.....	4	...	1	...	1	2	1	...
Bega.....	1	1	.....	...	...	...	...	...	1	...	...
Bellingen.....	1	1	.....	...	...	...	...	...	1	...	...
Berrigan.....	1	.....	.....	1	...	1	...	...	...	...	...
Bingara.....	1	.....	.....	1	...	1	...	...	...	...	...
Blackheath.....	2	.....	1	1	...	1	1	...	...	...	...
Blayney.....	2	1	.....	1	...	...	...	2	...	...	...
Bogan Gate.....	1	.....	.....	1	1	...	...	...	...	...	...
Boggabri.....	2	.....	.....	2	...	1	1	...	...	...	...
Bomaderry.....	1	.....	.....	1	...	...	...	1	...	...	...
Bombala.....	3	.....	.....	3	...	1	1	1	...	...	...
Bourke.....	1	.....	.....	1	...	...	1	...	...	...	...
Bowral.....	1	.....	.....	1	...	...	1	...	...	...	...
Bowraville.....	1	1	.....	...	...	...	...	...	1	...	...
Braidwood.....	1	.....	.....	1	...	1	...	...	...	...	...
Brooklyn.....	1	.....	.....	1	...	...	1	...	...	...	...
Broken Hill.....	2	2	.....	...	...	...	...	1	1	...	...

TABLE IV.—Nature of Private Hospitals Licensed in New South Wales (Sydney and environs excepted), 1916—*continued*.

District.	Licenses held.	Medical, Surgical, and Lying-in.	Medical and Surgical.	Lying-in.	Beds.							
					1	2	3	4-5	6-10	11-20	Over 20.	
Brushgrove.....	1	1	.....	...	...	...	...	...	1	...	...
Burrowa.....	1	.....	.....	1	1	...	...	...	...	...	...
Byangum.....	1	.....	.....	1	...	1	...	...	...	...	...
Camden.....	2	.....	.....	2	...	2	...	...	...	...	...
Campbelltown.....	2	1	.....	1	...	1	...	1	...	...	...
Canbelego.....	1	.....	.....	1	...	...	...	1	...	...	...
Candelo.....	1	.....	.....	1	...	1	...	...	...	...	...
Canowindra.....	1	1	.....	...	...	...	...	...	1	...	...
Carcoar.....	1	1	.....	...	...	...	...	...	1	...	...
Carrington.....	1	.....	.....	1	...	...	1	...	...	...	...
Casino.....	4	2	.....	2	...	1	1	...	2	...	...
Cessnock.....	1	.....	1	...	...	...	...	1	...	...	...
Coff's Harbour.....	1	1	.....	...	...	...	...	...	...	1	...
Coledale.....	1	.....	.....	1	...	1	...	...	...	...	...
Condobolin.....	1	.....	.....	1	...	...	1	...	...	...	...
Coolamon.....	1	.....	.....	1	...	...	...	...	1	...	...
Cooma.....	2	1	1	...	...	1	...	...	1	...	...
Coonabarabran.....	2	1	.....	1	...	1	...	...	1	...	...
Coonamble.....	1	1	.....	...	...	...	...	...	1	...	...
Cootamundra.....	3	3	.....	...	...	...	1	...	1	1	...
Coraki.....	3	2	.....	1	...	...	1	2	...	...	...
Corowa.....	2	2	.....	...	...	...	...	...	1	1	...
Cowra.....	3	1	.....	2	...	1	1	...	1	...	...
Crookwell.....	3	2	.....	1	1	...	...	1	1	...	...
Culcaira.....	2	1	.....	1	1	...	1	...	...	...	...
Cumnock.....	1	1	.....	...	...	...	...	1	...	...	...
Dapto.....	1	1	.....	...	...	...	1	...	...	...	...
Delegate.....	2	.....	.....	2	...	1	1	...	...	...	...
Deniliquin.....	3	.....	.....	3	1	1	...	1	...	...	...
Denman.....	1	1	.....	...	...	...	1	...	...	...	...
Dorrigo.....	2	.....	.....	2	1	...	...	1	...	...	...
Dubbo.....	7	3	.....	4	...	2	1	1	1	2	...
Dunedoo.....	.....	.....	.....	...	...	...	...	...	...	...	...
Dungog.....	4	1	.....	3	1	2	1	...	...	...	...
Emmaville.....	1	.....	.....	1	...	...	1	...	...	...	...
Finley.....	1	.....	1	...	...	...	...	...	1	...	...
Forbes.....	2	1	.....	1	1	...	...	1	...	...	...
Ganmain.....	2	1	.....	1	...	1	...	...	1	...	...
Gilgandra.....	1	1	.....	...	...	...	...	1	...	...	...
Glen Ellen.....	1	.....	.....	1	...	1	...	...	...	...	...
Glen Innes.....	5	2	.....	3	1	1	...	...	3	...	...
Gloucester.....	1	.....	.....	1	...	1	...	...	...	...	...
Goulburn.....	7	2	1	4	2	1	...	1	1	2	...	
Grafton.....	8	2	.....	6	...	1	3	2	...	2	...
Grenfell.....	2	.....	.....	2	...	...	2	...	...	...	...
Gulgong.....	1	1	.....	...	...	...	...	1	...	...	...
Gundagai.....	3	.....	1	2	...	...	1	1	1	...	...
Gunnedah.....	2	.....	.....	2	...	...	...	1	1	...	...
Gunning.....	1	.....	.....	1	...	1	...	...	...	...	...
Guyra.....	2	2	.....	...	...	...	...	2	...	...	...
Hay.....	4	.....	.....	4	1	2	1	...	...	...	...
Henty.....	2	1	.....	1	...	...	1	1	...	...	...
Holbrook.....	1	1	.....	...	...	...	...	...	1	...	...
Inverell.....	7	2	1	4	2	1	...	2	1	1	...	
Jerilderie.....	1	.....	.....	1	1	...	...	...	...	...	...
Junee.....	2	.....	.....	2	...	...	1	...	1	...	...
Katoomba.....	2	2	.....	...	...	...	...	...	1	1	...
Kempsey.....	3	2	.....	1	...	...	...	...	2	1	...
Kurri Kurri.....	1	.....	.....	1	1	...	...	...	...	...	...
Kyogle.....	1	1	.....	...	...	...	...	...	...	1	...
Lake Cudgellico.....	2	1	.....	1	...	2	...	...	...	...	...
Lawson.....	1	1	.....	...	...	...	...	...	1	...	...
Leeton.....	1	.....	.....	1	...	...	...	1	...	...	...
Leura.....	1	.....	1	...	...	...	...	...	...	1	...
Lismore.....	10	4	.....	6	...	...	2	2	2	4	...
Lithgow.....	2	.....	.....	2	1	...	...	1	...	...	...
Liverpool.....	2	.....	.....	2	1	1	...	...	...	...	...
Lockhart.....	3	2	.....	1	1	...	...	...	2	...	...
Macksville.....	3	.....	.....	3	...	2	...	1	...	...	...
Maclean.....	3	.....	.....	3	...	1	2	...	...	...	...
Maitland.....	7	1	1	5	...	4	...	1	2	...	...
Manildra.....	1	.....	.....	1	...	...	1	...	...	...	...
Manilla.....	3	1	.....	2	...	1	...	2	...	...	...
Mayfield.....	3	.....	.....	3	1	2	...	...	...	...	...

TABLE IV.—Nature of Private Hospitals Licensed in New South Wales (Sydney and environs excepted), 1916—*continued*.

District.	Licenses held.	Medical, Surgical, and Lying-in.	Medical and Surgical.	Lying-in.	Beds.						
					1	2	3	4-5	6-10	11-20	Over 20.
Merriwa.....	1	.....	.....	1	...	1	...	...	...	...	...
Millthorpe.....	2	2	.....	...	1	1	...	...	...	...	...
Milton.....	1	.....	.....	1	...	...	1	...	...	...	...
Molong.....	2	1	.....	1	...	2	...	...	...	...	...
Moreo.....	3	2	.....	1	...	...	1	...	1	1	...
Morpeth.....	1	.....	.....	1	...	1	...	...	...	...	...
Mortdale.....	1	.....	.....	1	...	1	...	...	...	...	...
Moruya.....	1	.....	.....	1	1	...	...	...	...	...	...
Moss Vale.....	4	.....	.....	4	...	1	...	...	...	...	...
Mudgee.....	5	4	.....	1	...	...	...	2	3	...	...
Mullumbimby.....	2	2	.....	...	...	...	...	1	1	...	...
Mungindi.....	1	.....	.....	1	...	1	...	...	...	...	...
Murrumburrah.....	1	1	.....	...	...	...	...	1	...	...	...
Murwillumbah.....	6	1	.....	5	...	1	3	...	2	...	...
Muswellbrook.....	2	2	.....	...	...	...	...	...	2	...	...
Nabiac.....	2	1	.....	1	1	...	...	...	1	...	...
Narrabri.....	3	1	.....	2	...	...	...	2	1	...	...
Narrandera.....	2	1	.....	1	...	...	...	1	...	1	...
Narromine.....	2	.....	.....	2	...	...	2	...	...	...	...
Newcastle.....	3	1	.....	2	1	...	1	...	1	...	...
Nowra.....	3	2	.....	1	...	1	...	...	2	...	...
Nyngan.....	2	1	.....	1	...	...	1	...	1	...	...
Oberon.....	1	1	.....	...	1	...	...	...	...	...	...
Orange.....	7	2	.....	5	...	2	...	5	1	1	...
Pambula.....	1	.....	.....	1	...	...	1	...	...	...	...
Parkos.....	7	2	.....	5	1	3	...	1	2	...	...
Parramatta.....	3	.....	.....	3	1	...	1	...	1	...	...
Peak Hill.....	2	.....	.....	2	...	1	...	1	...	...	...
Pictou.....	1	1	.....	...	...	...	...	1	...	...	...
Portland.....	1	.....	.....	1	...	1	...	...	...	...	...
Port Macquarie.....	1	1	.....	...	...	1	...	...	...	...	...
Queanbeyan.....	2	.....	.....	2	...	1	1	...	...	...	...
Quirindi.....	4	.....	.....	4	...	3	...	...	1	...	...
Richmond.....	2	1	.....	1	...	...	1	...	...	...	1
Rylstone.....	2	1	.....	1	...	...	1	1	...	...	...
Scone.....	4	2	.....	2	...	1	1	1	1	...	...
Singleton.....	5	1	.....	4	...	1	1	2	1	...	...
St. Mary's.....	1	1	.....	...	...	...	1	...	...	...	...
Tanworth.....	7	1	1	5	1	1	...	1	3	1	...
Taree.....	2	2	.....	...	...	...	...	...	1	1	...
Temora.....	8	1	1	6	1	2	1	3	1	...	...
Tontorfield.....	2	1	.....	1	...	...	...	1	1	...	...
Tinonee.....	1	.....	.....	1	...	...	1	...	...	...	...
Tocumwal.....	2	1	.....	1	...	...	...	2	...	...	...
Trangio.....	2	1	.....	1	...	...	1	...	1	...	...
Trundle.....	1	.....	.....	1	...	...	...	1	...	...	...
Tumblong.....	1	.....	.....	1	1	...	...	...	...	...	...
Tumut.....	2	.....	.....	2	...	...	2	...	...	...	...
Tuncurry.....	1	.....	.....	1	1	...	...	...	...	...	...
Tweed Heads.....	1	1	.....	...	...	...	...	1	...	...	...
Uralla.....	2	.....	.....	2	...	...	...	2	...	...	...
Urana.....	1	.....	.....	1	...	1	...	...	...	...	...
Urunga.....	1	.....	.....	1	1	...	...	...	...	...	...
Wagga Wagga.....	7	1	.....	6	...	...	2	4	...	1	...
Walecha.....	1	.....	.....	1	...	...	1	...	...	...	...
Warialda.....	1	.....	.....	1	...	1	...	...	...	...	...
Warren.....	3	.....	.....	3	1	1	...	1	...	...	...
Wauchope.....	1	.....	.....	1	...	1	...	...	...	...	...
Wee Waa.....	1	.....	.....	1	...	1	...	...	...	...	...
Wellington.....	3	2	.....	1	...	1	...	...	2	...	...
Whitton.....	1	.....	.....	1	...	1	...	...	...	...	...
Wingham.....	2	.....	.....	2	...	...	...	1	1	...	...
Wollongong.....	3	2	.....	1	...	1	1	...	1	...	...
Woonona.....	2	.....	.....	2	...	2	...	...	...	...	...
Wyalong.....	4	1	.....	3	...	...	2	1	1	...	...
Wyang.....	1	.....	.....	1	...	...	1	...	...	...	...
Yass.....	3	.....	.....	3	1	2	...	...	...	...	...
Young.....	6	.....	1	5	1	3	...	1	...	1	...
Total.....	382	124	12	246	40	89	67	77	80	28	1

TABLE V.—Qualifications of Licensees and Resident Managers of Private Hospitals Licensed in Sydney and environs, 1916.

District.	Licensee and R.M. identical.	Licensee and R.M. different.	Licensees.			Resident Managers.					
			Duly qualified M.P.	Qualified Nurses.	Un-qualified persons.	Duly qualified M.P.	Under Section—				
							10 (a).	10 (b).	10 (c).	10 (d).	
										(1)	(2)
Annandale	2	1	1	2	1	...	...	1	...	1	1
Arncliffe	2	...	...	1	1	...	...	...	1	...	1
Ashfield	3	1	...	3	1	...	...	1	1	2	...
Auburn	3	...	...	2	1	...	...	1	...	2	...
Bankstown	1	...	...	1	...	...	...	1	...	...	...
Balmain	3	...	...	2	1	...	...	1	...	1	1
Burwood	4	...	...	4	...	...	...	1	1	2	...
Bondi	2	...	...	2	...	...	...	1	...	1	...
Campsie	1	...	...	1	...	...	...	1	...	...	...
Carlton	1	...	...	1	...	...	...	1	...	...	...
Chatswood	3	...	...	2	1	...	...	1	1	...	1
Concord.....	1	...	...	1	...	...	...	1	...	...	...
Darlinghurst.....	10	...	...	10	...	...	1	...	8	1	...
Darlington	1	...	...	1	...	...	...	1	...	...	...
Drummoyne	3	1	1	2	...	...	...	2	1	...	...
Dulwich Hill	5	...	...	5	...	...	...	2	2	1	...
Eastwood.....	1	...	...	1	...	...	...	...	...	1	...
Enmore	4	...	...	4	...	...	...	1	...	3	...
Forest Lodge	3	...	...	3	...	...	...	...	...	3	...
Five Dock.....	...	1	...	1	...	...	...	1	...	...	...
Gladesville	3	...	...	2	1	...	...	1	...	2	...
Glebe	4	...	...	4	...	...	...	2	...	2	...
Gore Hill.....	1	...	...	1	...	...	...	1	...	...	...
Granville.....	1	...	...	1	...	...	...	1	...	...	...
Haberfield.....	2	...	...	1	1	...	...	1	...	...	1
Hornsby	1	...	...	1	...	...	...	1	...	...	...
Hunter's Hill.....	1	1	2	...	...	...	...	...	...	2	...
Kensington.....	6	...	...	5	1	...	...	5	...	...	1
Killara	1	...	...	1	...	...	...	...	1	...	...
Kogarah	1	...	...	1	...	...	...	...	...	1	...
Leichhardt	3	1	...	4	...	...	...	1	1	2	...
Lewisham	1	...	...	1	...	...	...	1	...	...	...
Lidcombe.....	1	...	...	1	...	...	...	1	...	...	...
Manly	6	1	1	6	...	...	...	2	5	...	...
Marrickville	7	1	...	8	...	...	...	7	...	1	...
Mosman	4	...	...	4	...	...	...	1	1	2	...
Newtown.....	2	...	...	2	...	...	...	2	...	...	...
Neutral Bay	5	...	...	5	...	...	...	2	1	2	...
North Sydney	8	1	...	9	...	...	1	3	3	2	...
Paddington	5	1	1	5	...	...	1	4	1	...	...
Pennant Hills	1	...	...	1	...	...	1	...	...	...	...
Petersham	6	...	...	4	2	...	2	2	...	...	2
Potts Point	1	...	...	1	...	...	...	...	...	1	...
Pymont	1	...	...	1	...	...	...	...	...	1	...
Randwick	4	...	...	4	...	...	...	...	2	2	...
Redfern	3	...	...	2	1	...	...	1	...	1	1
Rozelle	2	...	...	2	...	...	...	1	...	1	...
Rockdale	3	...	...	3	...	...	...	3	...	...	...
Rose Bay	2	...	...	2	...	...	...	2	...	...	...
Roseville	1	...	...	1	...	...	...	1	...	...	...
Ryde	2	...	...	2	...	...	...	1	...	1	...
Stanmore	2	...	...	2	...	...	...	1	1	...	...
Summer Hill	2	...	...	2	...	...	...	...	...	2	...
Sydney	2	...	1	1	...	1	...	...	1	...	...
Wahroonga.....	...	1	...	...	1	1	...	...	...	...	...
Waitara.....	1	...	...	1	2	...	...	...	...	1	...
Waverley	9	1	...	10	...	...	...	3	1	6	...
Willoughby	1	...	...	1	...	...	...	...	...	...	1
Woollahra	2	1	...	2	1	...	...	1	...	2	...
Total.....	160	13	7	153	13	2	6	70	33	52	10

R.M. signifies Resident Manager; M.P., duly qualified Medical Practitioner. (1) Signifies Nurse qualified, but not strictly in accordance with requirements of Act. (2) Signifies unqualified persons approved under special circumstances.

TABLE VI.—Qualifications of Licensees and Resident Managers of Private Hospitals
Licensed in New South Wales (Sydney and environs excepted), 1916.

District.	Licencee and R.M. identical.	Licencee and R.M. different.	Licenses.			Resident Managers.					
			Duly qualified M.P.	Qualified Nurses.	Un- qualified persons.	Duly qualified M.P.	Under Section—				
							10 (a).	10 (b).	10 (c).	10 (d).	
							10 (a).	10 (b).	10 (c).	(1)	(2)
Abermain.....	1	...	...	1	...	...	...	1	...	...	...
Adamstown.....	1	...	...	1	...	...	...	...	...	1	...
Adelong.....	1	...	...	...	1	...	...	...	...	...	1
Albury.....	4	...	1	3	...	1	...	...	3	...	...
Armidale.....	3	1	1	...	3	...	...	...	1	1	2
Ballina.....	...	1	...	1	...	...	...	...	1	...	...
Balranald.....	3	...	...	...	3	...	...	...	...	...	3
Bangalow.....	2	...	2	...	...	2	...	...	...	...	...
Barmedman.....	1	...	1	...	...	1	...	...	...	...	...
Barraba.....	1	...	...	...	1	...	...	...	...	...	...
Bathurst.....	4	1	1	2	2	...	1	1	...	...	3
Bega.....	1	...	...	1	...	...	...	...	1	...	...
Bellingen.....	1	...	...	1	...	...	...	...	1	...	...
Berrigan.....	1	...	...	...	1	...	...	...	...	...	1
Bingara.....	1	...	...	...	1	...	...	...	...	...	1
Blackheath.....	2	...	...	1	1	...	...	1	...	...	1
Blayney.....	2	...	...	1	1	...	...	...	...	1	1
Bogan Gate.....	1	...	...	...	1	...	...	...	...	...	1
Boggabri.....	2	...	...	...	2	...	...	...	...	...	2
Bomaderry.....	1	...	...	...	1	...	...	...	...	1	...
Bombala.....	2	1	...	1	2	...	...	...	...	2	1
Bourke.....	1	...	...	...	1	...	...	...	...	...	1
Bowral.....	1	...	...	1	...	...	...	...	...	1	...
Bowraville.....	1	...	1	...	...	1	...	...	...	...	...
Braidwood.....	1	...	...	...	1	...	...	...	...	...	1
Broken Hill.....	2	...	...	1	1	...	...	...	...	1	1
Brooklyn.....	1	...	...	...	1	...	...	...	...	...	1
Brushgrove.....	1	...	1	...	...	1	...	...	...	...	...
Burrowa.....	1	...	...	...	1	...	...	...	...	...	1
Byangum.....	1	...	...	...	1	...	...	...	...	...	1
Camden.....	2	...	...	1	1	...	...	...	...	1	1
Campbelltown.....	2	...	...	1	1	...	...	...	...	1	1
Canbelego.....	1	...	...	...	1	...	...	...	...	...	1
Candelo.....	1	...	...	...	1	...	...	...	...	...	1
Canowindra.....	1	...	...	1	...	...	...	...	1	...	...
Carcoar.....	1	...	...	1	...	...	...	1	...	...	...
Carrington.....	1	...	...	...	1	...	...	...	...	...	1
Casino.....	4	...	...	2	2	...	...	...	2	...	2
Cessnock.....	1	...	...	1	...	...	...	1	...	...	...
Coff's Harbour.....	1	...	...	1	...	...	...	...	1	...	...
Coledale.....	1	...	...	...	1	...	...	...	...	...	1
Condobolin.....	1	...	...	1	...	...	...	1	...	...	...
Coolamon.....	1	...	...	1	...	...	...	1	...	...	...
Cooma.....	2	...	1	1	...	1	...	...	1	...	...
Coonabarrabran.....	2	...	...	1	1	...	...	...	...	1	1
Coonamble.....	1	...	1	...	...	...	...	...	...	1	...
Cootamundra.....	3	...	...	1	2	...	...	...	...	2	1
Coraki.....	3	...	...	...	3	...	...	...	...	1	2
Corowa.....	1	1	1	1	...	...	...	...	...	2	...
Cowra.....	3	...	...	1	2	...	...	...	...	1	2
Crookwell.....	3	...	...	2	1	...	...	...	1	1	1
Culcairn.....	2	...	...	1	1	...	...	...	...	1	1
Cumnock.....	1	...	1	...	...	1	...	...	...	...	...
Dapto.....	1	...	...	...	1	...	...	...	...	1	...
Delegate.....	2	...	...	...	2	...	...	...	...	...	2
Deniliquin.....	3	...	...	...	3	...	...	...	...	...	3
Denman.....	1	...	...	1	...	...	...	...	1	...	...
Dorrigo.....	2	...	...	1	1	...	...	1	...	...	1
Dubbo.....	7	...	...	4	3	...	...	1	...	3	3
Dungog.....	4	...	...	2	2	...	...	...	1	1	2
Emmaville.....	1	...	...	...	1	...	...	...	...	...	1
Finley.....	1	...	...	1	...	...	1	...	...	...	...
Forbes.....	2	...	...	1	1	...	...	...	...	1	1
Gannmain.....	2	...	...	1	1	...	...	1	...	...	1
Gilgandra.....	1	...	1	...	...	1	...	...	...	...	...
Glen Ellen.....	1	...	...	...	1	...	...	...	...	...	1
Glen Innes.....	5	...	...	3	2	...	...	...	...	3	2
Gloucester.....	1	...	...	...	1	...	...	...	...	...	1
Goulburn.....	6	1	1	3	3	1	...	2	1	2	2
Grafton.....	8	...	...	5	3	...	1	1	1	2	3
Grenfell.....	2	...	...	1	1	...	...	...	...	1	1
Gulgong.....	1	...	...	...	1	...	...	...	...	...	1
Gundagai.....	2	1	...	1	2	...	1	...	...	1	1
Gunnedah.....	2	...	...	1	1	...	...	1	...	...	1
Gunning.....	1	...	...	1	...	...	...	...	...	...	1
Guyra.....	2	...	...	1	1	...	...	...	...	1	1
Hay.....	4	...	...	...	4	...	...	...	...	...	4
Henty.....	2	...	1	...	1	1	...	...	...	...	1
Holbrook.....	1	...	...	1	...	...	...	...	1	...	...
Inverell.....	6	1	...	3	4	...	1	1	1	...	4
Jerilderie.....	1	...	...	...	1	...	...	...	...	...	1
Junee.....	1	1	...	1	1	...	...	1	...	...	1
Katoomba.....	2	...	...	2	...	...	...	...	1	1	...
Kempsey.....	2	1	1	2	...	...	...	1	...	2	...
Kurri Kurri.....	1	...	...	1	...	...	...	...	...	1	...

R.M. signifies Resident Manager; M.P., duly qualified Medical Practitioner (1) Signifies Nurse qualified, but not strictly in accordance with requirements of Act. (2) Signifies unqualified persons approved under special circumstances.

TABLE VI.—Qualifications of Licensees and Resident Managers of Private Hospitals Licensed in New South Wales (Sydney and environs excepted), 1916—*continued*.

Districts.	Licensee and R.M. identical.	Licensee and R.M. different.	Licensees.			Resident Managers.				
			Duly qualified M.P.	Qualified Nurses.	Un-qualified persons.	Duly qualified M.P.	Under Section—			
							10 (a).	10 (b).	10 (c).	10 (d).
										(1) (2)
Kyogle.....	...	1	1	...	...	...	...	...	...	1 ...
Lake Cudgellico	2	...	...	1	1	...	...	...	...	1 1
Lawson	1	...	...	1	...	...	...	...	1	...
Leeton.....	1	...	1	...	...	...	...	1	...	...
Leura.....	1	...	...	1	...	...	1	...	...	...
Lismore	10	...	...	6	4	...	...	1	3	2 4
Lithgow	2	...	...	1	1	...	...	...	...	1 1
Liverpool	2	...	...	1	1	...	...	1	...	...
Lockhart.....	2	1	2	...	1	1	...	...	...	...
Macksville.....	3	...	...	...	3	...	...	...	...	...
Macleay.....	3	...	...	1	2	...	...	1	...	...
Maitland	7	...	...	5	2	...	...	2	1	2 2
Manildra	1	...	...	1	...	...	...	1	...	...
Manilla	3	...	...	2	1	...	...	1	...	1 1
Mayfield	3	...	...	2	1	...	...	2	...	1 ...
Merriwa.....	1	...	...	1	...	...	...	1	...	...
Millthorpe	2	...	...	2	...	...	...	...	...	2 ...
Milton.....	1	...	...	1	...	...	...	1	...	...
Molong	2	...	...	1	1	...	...	1	...	...
Morée	3	...	...	2	1	...	...	...	1	1 1
Morpeth	1	...	...	1	...	...	...	1	...	...
Mortdale	1	...	...	1	...	...	...	1	...	...
Moruya	1	...	...	1	...	...	...	1	...	...
Moss Vale	4	...	...	2	2	...	...	...	...	2 2
Mudgee	5	...	...	3	2	...	...	...	1	2 2
Mullumbimby.....	2	...	...	1	1	...	...	...	1	...
Mungindi.....	1	...	...	...	1	...	...	...	...	1 ...
Murrumburrah .....	...	1	1	...	...	...	...	...	...	1 ...
Murwillumbah.....	5	1	1	3	2	...	...	3	...	1 2
Muswellbrook.....	2	...	...	1	1	...	...	1	...	...
Nabiac	2	...	...	2	...	...	...	...	1	1 ...
Narrabri	2	1	...	2	1	...	...	1	1	...
Narrandera.....	2	...	...	1	1	...	...	...	...	1 1
Narromine	2	...	...	2	...	...	...	2	...	...
Newcastle	3	...	...	2	1	...	...	1	1	...
Nowra	3	...	...	2	1	...	...	...	1	1 1
Nyngan	2	...	...	1	1	...	...	...	...	1 1
Oberon	1	...	1	...	...	1	...	...	...	...
Orange	7	...	...	5	2	...	...	2	2	1 2
Pambula	1	...	...	...	1	...	...	...	...	...
Parkes	7	...	...	5	2	...	...	2	1	1 3
Parramatta	3	...	...	3	...	...	...	2	...	1 ...
Peak Hill	2	...	...	1	1	...	...	1	...	...
Picton.....	1	...	...	1	...	...	...	...	...	1 ...
Portland.....	1	...	...	1	...	...	...	...	...	1 ...
Port Macquarie	1	...	...	1	...	...	...	...	...	1 ...
Queanbeyan	2	...	...	1	1	...	...	1	...	...
Quirindi	4	...	...	1	3	...	...	...	...	1 3
Richmond	1	1	...	2	...	...	...	1	1	...
Rylstone	2	...	...	1	1	...	...	1	...	...
Scone	4	...	...	2	2	...	...	...	2	...
Singleton.....	4	1	1	1	3	...	...	1	1	...
St. Mary's	1	...	...	1	...	...	...	...	...	1 ...
Tamworth.....	6	1	...	7	...	...	1	4	...	...
Taree	1	1	...	1	1	...	...	...	...	1 1
Temora	7	1	1	2	5	1	...	1	1	...
Tenterfield	2	...	...	2	...	...	...	1	...	1 ...
Tinonee	1	...	...	...	1	...	...	...	...	...
Toomswal	1	1	1	...	1	...	...	...	...	1 1
Trangie	2	...	1	1	...	1	...	1	...	...
Trundle .....	...	1	1	...	...	...	...	1	...	...
Tumut.....	2	...	...	1	1	...	...	1	...	...
Tumblong	1	...	...	...	1	...	...	...	...	...
Tuncurry.....	1	...	...	...	1	...	...	...	...	...
Tweed Heads	1	...	...	1	...	...	...	...	...	1 ...
Uralla	2	...	...	1	1	...	...	...	...	1 1
Urana	1	...	...	...	1	...	...	...	...	...
Urunga.....	1	...	...	...	1	...	...	...	...	...
Wagga Wagga	7	...	...	6	1	...	...	2	...	4 1
Walcha.....	1	...	...	1	...	...	...	1	...	...
Wariakla.....	1	...	...	...	1	...	...	...	...	...
Warren.....	3	...	...	...	3	...	...	...	...	...
Wauchope.....	1	...	...	1	...	...	...	1	...	...
Wee Waa	1	...	...	1	...	...	...	...	...	1 ...
Wellington	3	...	...	3	...	...	...	1	1	1 ...
Whitton	1	...	...	...	1	...	...	...	...	...
Wingham	2	...	...	1	1	...	...	...	...	1 1
Wollongong	3	...	...	3	...	...	1	...	...	2 ...
Woonona.....	2	...	...	...	2	...	...	...	...	...
Wyalong.....	4	...	...	2	2	...	...	...	1	1 2
Wyong.....	1	...	...	1	...	...	...	1	...	...
Yass	3	...	...	1	2	...	...	1	...	...
Young	6	...	...	3	3	...	1	2	...	...
Total.....	360	22	28	189	165	15	9	70	41	85 162

R.M. signifies Resident Manager; M.P., duly qualified Medical Practitioner. (1) Signifies Nurse qualified, but not strictly in accordance with requirements of Act. (2) Signifies unqualified persons approved under special circumstances

INFECTIOUS DISEASES PREVALENT IN NEW SOUTH WALES DURING THE YEAR ENDED 31st DECEMBER, 1916.

UNDER the Public Health Act, Part III, the Governor may, by Proclamation in the *Gazette*, declare that any disease therein named is an infectious disease. This Part of the Act was brought into operation on 1st January, 1898, when scarlet fever, typhoid fever, and diphtheria were proclaimed infectious diseases for the purposes of the Act. In 1900 bubonic plague was added to the list, and infantile paralysis (acute anterior poliomyelitis) in 1912. In 1915 two other diseases (acute malarial fever and epidemic cerebro-spinal fever—meningococcal meningitis) were proclaimed as infectious. The diseases at present ordinarily notifiable under the Public Health Act, 1902, are:—

Typhoid fever	} Notifiable from 1st January, 1898.
Scarlet fever	
Diphtheria or Membranous Croup	
Bubonic plague	„ 23rd January, 1900.
Infantile paralysis (acute anterior poliomyelitis)	„ 1st February, 1912.
Acute malarial fever	„ 17th March, 1915.
Epidemic cerebro-spinal fever (meningococcal meningitis)	„ 11th October, 1915.
Pulmonary tuberculosis (<i>see below</i>).	

The notified cases of the diseases above mentioned, and the deaths therefrom, are recorded in the Tables which follow (pp. 52-60).

Smallpox.—A Report on an “Outbreak of Mild Smallpox in New South Wales, 1913-1916,” will be found on p. 108.

The Public Health Act, 1902, Part III, Division 2, requires that “on the appearance of any case of smallpox, or eruptive fever which may reasonably be supposed to be smallpox . . . the medical practitioner attending the case shall immediately report in writing such case,” either to the Board of Health or the Medical Officer of Health for the district. Under the Public Health (Amendment) Act, 1915, provision is made whereby districts in which cases of smallpox occur may be proclaimed infected areas, and steps taken to segregate or isolate the persons within such areas, and to prevent ingress into or egress therefrom except under prescribed conditions.

Leprosy.—The Twenty-sixth Annual Report on Leprosy in New South Wales is contained in Part IV (p. 127). Medical practitioners attending or becoming aware of cases of leprosy or suspected leprosy are required to notify the cases in writing under the provisions of the Public Health Act, 1902, Part III, Division 2.

Bubonic Plague.—No case of plague in man has occurred in New South Wales since 1908. A watch is kept on rats in the city and in the vicinity of wharves, and returns in this connection will be found on page 174. No infected rat has been found since 1910.

Public Health (Amendment) Act, 1915.

Tuberculosis was made notifiable in the City of Sydney on the 18th October, 1904, the Sydney Municipal Council making by-laws for the purpose under the Sydney Corporation Act. These by-laws required that medical practitioners should notify all cases of pulmonary tuberculosis occurring within the city area seen or attended by them. A return of the cases notified within the City of Sydney from the 1st January, 1905, is shown in Table VI (p. 60).

By proclamation under the Public Health (Amendment) Act, 1915, pulmonary tuberculosis was made notifiable in the Metropolitan and Hunter River combined sanitary districts from 11th August, 1915; and in the Katoomba Municipality and Blue Mountains Shire from 2nd October, 1916; at present it is not notifiable elsewhere in the State.

TABLE I.—Showing the number of Notified Cases of, and Deaths from, the following diseases—Cerebro-spinal Fever (Meningococcal Meningitis), Diphtheria and Membranous Croup, Infantile Paralysis (Acute Anterior Poliomyelitis), Acute Malarial Fever, Malaria Fever, Scarlet Fever, Typhoid Fever, and Tuberculosis—in the METROPOLITAN COMBINED DISTRICT for the year ended 31st December, 1916.

Metropolitan District.	Typhoid Fever.		Scarlet Fever.		Diphtheria.		Infantile Paralysis.		Acute Malarial Fever.		Cerebro-Spinal Fever.		Tuberculosis.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
MUNICIPALITIES.														
Sydney (City of)	64	13	254	3	481	15	13	3	24	2	18	15	233*	108
Alexandria	83	9	23	...	35	3	3	...	...	...	1	1	16	4
Annandale	5	1	38	1	56	5	1	...	...	...	2	2	25	9
Ashfield	10	2	111	1	48	...	16	2	1	...	3	2	33	21
Balmain	11	3	100	1	89	10	12	...	...	...	2	2	48*	15
Bexley	2	...	117	1	42	...	5	...	...	...	6	2	12	5
Botany	52	4	12	...	20	...	1	...	...	...	1	...	2	...
Burwood.....	1	...	31	2	13	1	3	...	...	...	...	...	15	12
Canterbury.....	4	...	86	3	186	3	8	2	...	...	6	1	29	12
Concord	2	...	23	1	13	...	1	...	...	...	...	...	1	3
Darlington	9	2	17	...	12	1	...	...	...	...	1	1	10	1
Drummoyne	12	1	38	...	27	2	2	...	...	...	3	1	9	3
Eastwood	1	...	4	...	1	...	...	...	...	...	...	...	2	1
Enfield	3	2	15	...	6	1	2	1	...	...	...	...	6	3
Erskineville.....	2	...	29	1	31	3	...	...	...	...	1	1	6	5
Glebe	20	1	97	3	113	...	3	1	...	...	2	1	68*	9
Homebush .....	...	...	3	...	1	...	2	...	...	...	...	...	1	...
Hunter's Hill	8	1	11	1	12	3	...	...	...	...	2	1	5	9
Hurstville	3	1	39	1	26	1	5	3	...	...	4	2	15	4
Kogarah	3	2	72	1	39	5	2	...	...	...	3	1	28*	5
Lane Cove	3	...	7	...	10	...	2	...	...	...	...	...	1	1
Leichhardt	10	2	105	1	89	6	4	...	1	...	3	1	39	19
Manly	9	...	37	...	31	4	7	...	...	...	2	1	6	5
Marrickville	28	...	187	4	190	6	10	...	4	...	11	8	59*	15
Mascot.....	36	2	28	1	35	2	3	...	...	...	1	...	10	1
Mosman.....	7	1	47	...	24	2	2	...	...	...	...	...	16	8
Newtown	18	3	115	5	124	3	7	1	...	...	6	3	64	21
North Sydney.....	15	...	78	...	84	7	4	1	2	...	5	2	40*	14
Paddington.....	11	4	37	...	118	4	9	...	5	...	7	3	45*	18
Petersham.....	13	1	91	2	61	2	7	1	...	...	3	4	43*	12
Randwick	23	1	101	1	122	4	13	1	1	...	5	2	39*	12
Redfern	35	1	83	...	77	6	9	1	...	...	7	2	33	12
Rockdale.....	14	1	122	3	44	2	3	...	...	...	4	4	22	6
Ryde.....	8	...	46	...	41	...	2	...	...	...	...	...	12	4
St. Peters	6	...	33	1	64	1	3	...	...	...	1	...	17	4
Strathfield.....	4	...	24	...	5	1	1	...	...	...	...	...	6	3
Vaucluse.....	1	...	7	...	4	...	...	...	...	...	...	...	2	1
Waterloo	40	5	33	...	31	1	5	...	...	...	2	...	14	5
Waverley.....	22	2	66	...	66	3	1	...	...	...	3	3	31	10
Willoughby.....	3	2	39	...	42	1	6	...	1	...	1	...	22	8
Woollahra	3	...	32	...	42	1	5	...	1	...	1	...	17	6
Auburn	2	1	43	...	21	1	2	...	...	...	2	2	15	1
Bankstown.....	2	...	10	...	19	2	...	...	...	...	1	...	10	5
Cabramatta & Canley Vale .....	...	...	3	...	6	...	...	...	...	...	1	1	...	1
Dundas.....	1	...	9	...	6	...	...	...	...	...	...	...	1	...
Ermington and Rydalmere	1	...	1	...	3	...	...	...	...	...	...	...	39	17
Granville	6	1	33	...	28	...	1	...	...	...	...	...	12	3
Lidcombe	3	...	46	...	40	...	2	...	4	...	...	...	127*	112
Liverpool.....	10	1	8	...	24	2	1	...	11	...	8	2	22	10
Parramatta.....	3	3	32	...	39	10	1	...	...	...	...	...	32	27
Prospect and Sherwood .....	...	...	19	...	9	...	...	...	...	...	...	...	2	2
Smithfield and Fairfield .....	...	...	7	...	3	1	2	...	...	...	...	...	7	3
SHIRES.														
Hornsby (Ridings B and C)	3	1	57	...	21	2	2	...	...	...	1	...	32	17
Kuring-gai	9	...	30	...	24	2	4	...	...	...	...	...	19	7
Warringah (Ridings B & C)	4	...	7	...	8	...	1	...	...	...	1	1	1	1
Harbour of Port Jackson	5	...	...	...	2	...	...	...	3	...	1	...	2	1
Total.....	653	74	2,743	38	2,814	129	198	17	58	2	132	72	1,423	621
Death rate per cent. ...	11.33		1.38		4.58		8.58		3.84		54.54		43.64	

* In these Municipalities are situated district hospital, or convalescent home for soldiers.

TABLE II.—Showing the number of Notified Cases of, and Deaths from, Cerebro-spinal Fever (Meningococcal Meningitis), Diphtheria or Membranous Croup, Infantile Paralysis (Acute Anterior Poliomyelitis), Scarlet Fever, Typhoid Fever and Tuberculosis, in the HUNTER RIVER COMBINED DISTRICT, for the year ended 31st December, 1916.

District.	Typhoid Fever.		Scarlet Fever.		Diphtheria.		Infantile Paralysis.		Cerebro-spinal Fever.		Tuberculosis.	
	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.
MUNICIPALITIES.												
Adamstown .....	...	...	5	...	18	...	1	...	...	...	...	...
Carrington	2	...	2	...	9	...	1	...	...	...	...	...
Greta	1	...	...	...	5	...	...	...	...	...	...	...
Hamilton	1	...	8	...	13	...	2	1	...	...	...	2
Lambton	6	...	4	...	12	1	...	...	...	...	2	1
Maitland, East	6	...	18	...	3	...	...	...	...	...	1	2
Maitland, West	12	6	21	...	16	2	2	...	2	2	7	4
Merewether	2	...	3	...	15	1	...	...	...	...	1	...
Morpeth	2	...	...	...	2	...	...	...	...	...	1	...
Newcastle	5	6	12	...	12	7	1	1	...	...	3	6
Now Lambton	1	...	4	...	2	...	...	...	...	...	1	...
Raymond Terrace .....	...	...	...	...	1	...	...	...	...	...	...	...
Singleton	1	...	6	...	7	...	1	...	...	...	2	2
Stockton	1	...	6	...	2	...	1	...	...	...	2	2
Wallsend	7	6	7	...	26	2	...	...	...	...	2	2
Waratah	2	...	2	...	19	...	3	...	...	...	1	1
Wickham	7	...	5	...	27	...	2	...	...	...	2	5
SHIRES.												
Bolwarra	2	...	1	...	1	...	...	...	...	...	...	2
Cessnock	23	2	91	...	42	2	...	...	4	3	7	4
Lake Macquarie	11	...	10	...	17	3	...	...	...	...	...	4
Tarro	5	...	3	...	5	...	1	...	...	...	...	2
Port Stephens	3	1	1	...	6	1	...	...	...	...	...	...
Harbour of Port Hunter .....	...	...	...	...	...	...	...	...	...	...	...	...
Total	105	21	209	...	260	19	15	2	6	5	32	39
Death rate per cent.....	20		.....		7.3		13.3		83.3		...	

TABLE III.—Showing the number of Notified Cases of, and Deaths from, Cerebro-spinal Fever (Meningococcal Meningitis), Diphtheria or Membranous Croup, Infantile Paralysis (Acute Anterior Poliomyelitis), Acute Malarial Fever, Scarlet Fever and Typhoid Fever, in the REMAINDER OF STATE, for the year ended 31st December, 1916. (Tuberculosis is now notifiable in the Metropolitan and Hunter River Combined Districts, Katoomba Municipality and Blue Mountains Shire, but not elsewhere in the State).

District.	Typhoid Fever.		Scarlet Fever.		Diphtheria.		Infantile Paralysis.		Acute Malarial Fever.		Cerebro-spinal Fever.		Tuberculosis.*	
	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.
MUNICIPALITIES.														
Aberdeen .....	...	...	1	...	...	...	...	...	...	...	...	...	...	...
Albury	12	2	37	1	42	4	...	...	...	...	5	2	...	...
Armidale	4	...	70	5	33	6	...	...	...	...	...	...	...	...
Ballina	1	1	3	...	1	...	1	...	...	...	...	...	...	...
Balranald	1	...	...	...	3	...	...	...	...	...	3	2	...	...
Barraba	3	...	29	...	7	...	...	...	...	...	...	...	...	...
Bathurst	27	1	47	2	61	1	...	...	...	...	8	1	...	...
Bega .....	...	...	27	1	1	...	...	...	...	...	...	...	...	...
Berry	1	1	9	...	2	1	1	...	...	...	...	...	...	...
Bingara	3	...	3	...	...	...	...	...	...	...	...	...	...	...
Blayney .....	...	...	9	...	8	...	...	...	...	...	...	...	...	...
Bombala .....	...	1	2	...	1	...	...	...	...	...	...	...	...	...
Bourke	5	...	...	...	1	...	...	...	...	...	...	...	...	...
Bowral .....	...	1	21	...	4	...	...	...	...	...	...	...	...	...
Braidwood	1	...	3	...	3	...	...	...	...	...	...	...	...	...
Brewarrina	1	...	7	...	3	...	...	...	...	...	...	...	...	...
Broken Hill	146	18	41	...	532	20	1	...	...	...	14	4	...	...
Broughton Vale .....	...	1	...	...	...	...	...	...	...	...	...	...	...	...
Burrowa	1	...	1	...	19	1	...	...	...	...	...	...	...	...
Camden .....	...	1	11	...	4	...	...	...	...	...	...	...	...	...
Campbelltown	3	...	2	...	9	...	2	...	...	...	5	...	...	...
Carcoar	1	...	10	...	...	...	...	...	...	...	1	1	...	...
Casino	5	1	3	...	45	...	...	...	...	...	...	...	...	...
Castlereagh	1	...	5	...	...	...	...	...	...	...	...	...	...	...
Cobar	6	...	12	...	13	1	...	...	...	...	...	...	...	...
Condobolin	6	2	2	...	35	1	...	...	...	...	...	...	...	...
Cooma .....	...	...	13	2	19	...	...	...	...	...	...	...	...	...
Coonamble .....	...	...	75	4	9	3	...	...	...	...	...	...	...	...
Cootamundra	15	1	56	...	10	...	...	...	...	...	15	6	...	...
Coraki .....	...	...	...	...	7	1	6	...	...	...	...	...	...	...
Corowa .....	...	...	14	...	8	2	...	...	...	...	...	...	...	...
Cowra	3	1	27	...	22	2	...	...	...	...	1	1	...	...
Cudal .....	...	...	1	...	...	...	...	...	...	...	...	...	...	...
Cudgegong .....	...	...	5	...	1	...	...	...	...	...	...	...	...	...
Deniliquin	3	1	18	...	2	...	...	...	...	...	...	...	...	...
Dubbo	9	...	20	2	30	3	1	...	...	...	5	3	...	...

* Notifiable in Katoomba Municipality from 2nd October, 1916.

REMAINDER OF STATE—Return showing the number of Cases, &c., from Country Municipalities—*continued*.

District.	Typhoid Fever.		Scarlet Fever.		Diphtheria.		Infantile Paralysis.		Acute Malarial Fever.		Cerebro-spinal Fever.		Tuberculosis.*	
	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.
Dungog .....	...	...	2	...	...	...	...	...	...	...	...	...	...	...
Forbes	41	5	18	...	26	3	...	...	...	...	...	...	...	...
Gerrington .....	...	...	2	...	2	...	...	...	...	...	1	...	...	...
Glen Innes	17	3	43	3	17	...	2	...	...	...	1	1	...	...
Goulburn	18	1	67	...	73	2	...	...	...	...	26	10	...	...
Grafton	14	3	3	...	3	...	...	...	...	...	...	...	...	...
Grafton, South .....	...	...	2	...	1	...	2	...	...	...	...	...	...	...
Grenfell .....	...	...	1	1	35	...	...	...	...	...	...	...	...	...
Gulgong... ..	...	...	4	1	...	...	...	...	...	...	1	...	...	...
Gundagai .....	...	...	12	...	38	3	...	...	...	...	...	...	...	...
Gunnedah	9	...	...	...	9	1	...	...	...	...	...	...	...	...
Hay	3	...	37	3	2	...	...	...	...	...	...	...	...	...
Hillgrove .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Hillston .....	...	1	2	...	...	...	...	...	...	...	...	...	...	...
Illawarra, Central ..	...	...	5	...	2	...	3	...	...	...	...	...	...	...
Illawarra, North .....	...	...	23	...	3	...	...	...	...	...	...	...	...	...
Ingleburn .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Inverell	47	6	1	1	91	2	...	...	...	...	...	...	...	...
Jamberoo .....	...	...	2	...	3	...	2	...	...	...	4	1	...	...
Jerilderie .....	...	...	2	...	1	...	...	...	...	...	...	...	...	...
Junee	9	3	36	...	61	...	...	...	...	...	1	1	...	...
Katoomba.....	2	...	8	...	3	...	...	...	...	...	...	...	6	3
Kempsey	2	1	10	...	10	...	...	...	...	...	...	...	...	...
Kiama	1	1	...	...	25	1	...	...	...	...	12	8	...	...
Lismore	4	1	12	...	29	3	2	...	...	...	...	...	...	...
Lithgow	34	5	109	2	34	2	3	...	...	...	...	...	...	...
Maclean	1	...	...	...	...	...	1	...	...	...	...	...	...	...
Manilla	1	...	1	...	2	...	...	...	...	...	...	...	...	...
Mittagong .....	...	...	4	...	3	...	2	...	...	...	...	...	...	...
Moama .....	...	...	7	...	4	...	...	...	...	...	...	...	...	...
Molong	1	1	24	...	8	...	...	...	...	...	...	...	...	...
Moss Vale	1	...	8	...	1	...	...	...	...	...	...	...	...	...
Moree.....	4	1	...	...	2	1	2	...	...	...	...	...	...	...
Moruya .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Mudgee	1	...	6	...	2	1	...	...	...	...	1	1	...	...
Mulgoa .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Mullumbimby	1	...	...	...	2	1	...	...	...	...	...	...	...	...
Murrumburrah	5	...	14	...	11	1	...	...	...	...	...	...	...	...
Murrurundi	4	...	4	...	7	1	...	...	...	...	...	...	...	...
Murwillumbah	5	3	...	...	16	3	...	...	...	...	...	...	...	...
Muswellbrook	2	5	6	...	3	1	...	...	...	...	...	...	...	...
Narrabri	45	...	6	...	10	3	...	...	...	...	...	...	...	...
Narrabri, West.....	...	...	2	...	1	...	...	...	...	...	...	...	...	...
Narrandera	2	2	35	1	30	1	...	1	...	...	...	...	...	...
Narromine .....	...	...	24	...	25	...	...	...	...	...	...	...	...	...
Nowra .....	...	...	6	...	1	...	...	...	...	...	...	...	...	...
Nyngan	1	...	1	...	1	...	4	...	...	...	...	...	...	...
Orange	35	2	27	2	44	1	...	...	...	...	1	1	...	...
Orange, East .....	...	2	...	...	...	...	...	...	...	...	...	...	...	...
Parkes	21	1	23	1	18	...	3	1	...	...	...	...	...	...
Peak Hill .....	...	1	14	1	7	1	...	...	...	...	...	...	...	...
Penrith	7	...	27	...	15	3	4	...	...	...	1	1	...	...
Picton .....	...	...	17	...	9	...	...	...	...	...	...	...	...	...
Port Macquarie .....	...	...	...	...	1	...	...	...	...	...	...	...	...	...
Queanbeyan .....	...	...	12	1	2	...	...	...	...	...	...	...	...	...
Quirindi.....	5	...	4	...	28	2	...	...	...	...	1	...	...	...
Richmond	2	...	14	1	1	...	...	...	...	...	...	...	...	...
Scone	4	...	25	...	1	...	...	...	...	...	...	...	...	...
Shellharbour .....	...	...	10	1	2	...	...	...	...	...	1	...	...	...
Shoalhaven, South ..	...	...	1	...	1	1	...	...	...	...	...	...	...	...
St. Mary's .....	...	...	7	...	4	...	...	...	...	...	...	...	...	...
Tamworth	19	6	22	3	44	3	2	...	...	...	...	...	...	...
Taree	3	...	...	...	3	...	...	...	...	...	...	...	...	...
Temora	9	1	62	...	26	1	...	...	...	...	...	...	...	...
Tenterfield .....	...	...	1	...	...	...	1	...	...	...	...	...	...	...
Tumut	3	...	11	...	24	1	...	...	...	...	...	...	...	...
Ulladulla .....	...	...	...	...	1	...	...	...	...	...	...	...	...	...
Umarra	1	...	...	...	...	...	...	...	...	...	...	...	...	...
Uralla .....	...	...	3	...	10	...	...	...	...	...	...	...	...	...
Wagga	4	5	51	3	18	5	...	...	...	...	3	2	...	...
Walcha	3	...	14	...	1	...	...	...	...	...	...	...	...	...
Walgett .....	...	...	...	...	...	...	1	...	...	...	...	...	...	...
Wallendbeen.....	...	...	1	...	1	...	...	...	...	...	...	...	...	...
Warialda .....	...	...	1	...	...	...	...	...	...	...	...	...	...	...
Warren .....	...	...	29	2	2	...	...	...	...	...	...	...	...	...
Wellington	12	3	39	1	22	5	4	...	...	...	1	1	...	...
Wentworth .....	...	...	...	...	41	3	...	...	...	...	1	1	...	...
Wileannia .....	...	...	...	...	13	1	...	...	...	...	...	...	...	...
Windsor	1	...	7	...	6	...	...	...	...	...	...	...	...	...
Wingham .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Wollongong	2	...	12	...	19	2	...	...	...	...	3	2	...	...
Wrightville .....	...	...	2	...	1	...	...	...	...	...	...	...	...	...
Wyalong	1	1	4	...	5	...	...	...	...	...	...	...	...	...
Yass .....	...	...	46	2	9	...	...	...	...	...	...	...	...	...
Young	3	1	40	1	21	...	...	...	...	...	...	...	...	...
Total	669	98	1,650	48	1,932	105	50	1	1	...	116	50	6	3
Death rate per cent.	14.64		2.9		5.43		2		...		4.1		50	

* Notifiable in Katoomba Municipality from 2nd October, 1916.

REMAINDER OF STATE.—Return showing the number of Cases, &c., from Shires.

District.	Typhoid Fever.		Scarlet Fever.		Diphtheria.		Infantile Paralysis.		Acute Malarial Fever.		Cerebro-spinal Fever.		Tuberculosis. •	
	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.
SHIRES.														
Abercrombie	1	...	8	...	9	...	...	...	...	...	...	...	...	...
Adjungbilly .....	...	...	30	...	59	1	...	...	...	...	...	...	...	...
Amaroo	3	...	11	...	21	1	...	...	...	...	1	...	...	...
Apsley .....	...	...	8	...	1	...	...	...	...	...	...	...	...	...
Ashford	1	...	...	...	5	...	...	...	...	...	...	...	...	...
Bannockburn	4	...	2	...	16	...	...	...	...	...	1	...	...	...
Barraba .....	...	...	24	...	4	...	...	...	...	...	...	...	...	...
Baulkham Hills	2	1	2	...	7	1	2	...	...	...	...	...	...	...
Bellingen	3	1	...	...	13	1	...	...	...	...	...	...	...	...
Berrigan	4	...	1	...	7	...	3	...	...	...	2	1	...	...
Bibbenluke .....	...	...	23	...	1	...	...	...	...	...	...	...	...	...
Blacktown	10	...	9	...	6	...	...	...	...	...	...	...	...	...
Bland	3	...	15	...	36	1	...	...	...	...	...	...	...	...
Blaxland	4	...	30	1	14	1	...	...	...	...	2	2	...	...
Blue Mountains	2	...	18	...	11	1	3	...	1	...	...	...	38	3
Bogan .....	...	...	2	...	...	...	...	...	...	...	...	...	...	...
Booolooroo .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Boomi	2	...	1	...	4	...	...	...	...	...	...	...	...	...
Boree	5	1	15	...	50	1	...	...	...	...	1	...	...	...
Bulli .....	...	...	20	...	8	2	3	...	...	...	...	...	...	...
Burrangong	3	...	28	...	15	...	...	...	...	...	...	...	...	...
Byron .....	...	...	4	...	7	...	...	...	...	...	...	...	...	...
Cambewarra .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Canobolas	5	...	23	...	27	...	...	...	...	...	1	...	...	...
Carrathool .....	...	...	4	...	1	...	...	...	...	...	...	...	...	...
Clyde .....	...	...	4	...	5	...	1	...	...	...	...	...	...	...
Cobborah	1	...	12	1	10	...	...	...	...	...	1	...	...	...
Coekburn	4	...	5	...	9	...	...	...	...	...	...	...	...	...
Colo	1	...	22	...	12	...	1	...	...	...	...	...	...	...
Conargo .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Coolah .....	...	...	1	...	1	...	...	...	...	...	...	...	...	...
Coolamon	3	...	36	...	24	...	1	1	...	...	...	...	...	...
Coonabarabran .....	...	...	4	...	2	...	...	...	...	...	...	...	...	...
Copmanhurst	1	...	...	...	...	...	2	...	...	...	...	...	...	...
Coreen	2	...	2	...	50	2	...	...	...	...	1	...	...	...
Crookwell	2	1	83	5	51	4	2	...	...	...	...	...	...	...
Culcairn	2	...	27	...	21	...	1	...	...	...	1	...	...	...
Dalgety	2	...	11	...	13	...	...	...	...	...	...	...	...	...
Demondrille	4	...	7	1	5	...	...	...	...	...	...	...	...	...
Dorrigo	15	...	4	...	30	3	...	...	...	...	...	...	...	...
Dumaresq .....	...	...	14	...	20	...	1	...	...	...	...	...	...	...
Erina	1	...	7	...	10	2	1	...	...	...	2	...	...	...
Eurobodalla .....	...	...	6	...	3	...	2	...	...	...	1	1	...	...
Gadara .....	...	...	32	...	60	4	...	...	...	...	1	...	...	...
Ganmain .....	...	...	...	...	3	...	...	...	...	...	...	...	...	...
Gilgandra .....	...	...	3	...	31	...	...	...	...	...	...	...	...	...
Gloucester .....	...	...	...	...	6	...	...	...	...	...	...	...	...	...
Goobang	9	1	15	1	46	1	3	...	...	...	...	...	...	...
Goodradigbee	8	...	20	1	22	...	...	...	...	...	...	...	...	...
Gostwyck	1	...	6	...	15	...	...	...	...	...	...	...	...	...
Gundurimba .....	...	...	...	...	7	...	1	...	...	...	...	...	...	...
Gunning .....	...	...	12	...	6	...	...	...	...	...	1	...	...	...
Guyra	5	1	34	...	43	5	...	...	...	...	1	...	...	...
Gwydir	2	...	2	...	1	1	...	...	...	...	...	...	...	...
Harwood	2	...	...	...	2	...	...	...	...	...	...	...	...	...
Hastings	5	...	1	...	8	...	...	...	...	...	1	...	...	...
Holbrook	4	1	8	...	1	...	...	...	...	...	1	...	...	...
Hornsby	1	...	2	...	3	...	2	...	...	...	...	...	...	...
Hume	1	...	5	...	23	...	...	...	...	...	1	1	...	...
Illabo	3	...	19	...	11	...	...	...	...	...	...	...	...	...
Imlay .....	...	...	7	2	...	...	...	...	...	...	...	...	...	...
Jemalong	12	...	5	...	14	...	...	...	...	...	...	...	...	...
Jindalee	1	...	7	...	4	...	...	...	...	...	1	...	...	...
Kycamba	5	...	17	...	16	...	...	...	...	...	1	1	...	...
Kyogle	1	...	...	...	4	1	...	...	...	...	...	...	...	...
Lachlan	6	...	3	...	27	...	1	...	...	...	...	...	...	...
Liverpool Plains	1	...	4	...	13	1	...	...	...	...	...	...	...	...
Lockhart	3	...	8	...	9	2	...	...	...	...	1	...	...	...
Lyndhurst	5	...	14	...	26	...	...	...	...	...	...	...	...	...
McIntyre	7	...	4	...	8	...	...	...	...	...	...	...	...	...
Macleay	8	...	9	...	6	...	...	...	...	...	...	...	...	...
Macquarie	1	...	8	...	35	...	...	...	...	...	...	...	...	...
Mandowah	1	...	4	...	4	1	...	...	...	...	...	...	...	...
Manning	2	...	2	...	13	3	...	...	...	...	1	...	...	...
Marthaguy .....	...	...	5	...	...	...	...	...	...	...	...	...	...	...
Meroo	2	...	3	...	...	...	...	...	...	...	...	...	...	...
Merriwa	1	...	...	...	3	1	1	...	...	...	...	...	...	...
Mitchell	1	...	15	...	2	...	...	...	...	...	1	1	...	...
Monaro .....	...	...	21	1	2	...	...	...	...	...	...	...	...	...
Mulwaree	5	2	12	...	32	1	...	...	...	...	3	2	...	...
Mumbulla .....	...	1	5	...	1	...	...	...	...	...	...	...	...	...
Murrungal .....	...	...	3	...	18	...	...	...	...	...	...	...	...	...
Murray .....	...	...	...	...	1	...	...	...	...	...	3	2	...	...
Murrumbidgee .....	...	...	3	...	...	...	...	...	...	...	...	...	...	...
Muswellbrook .....	...	...	10	...	4	...	...	...	...	...	...	...	...	...
Nambucca	4	1	1	...	19	2	2	...	...	...	...	...	...	...

* Notifiable in the Blue Mountain Shire from 2nd October, 1916.

RETURN showing the number of Cases, &c., from Shires--continued.

District.	Typhoid Fever.		Scarlet Fever.		Diphtheria.		Infantile Paralysis.		Acute Malarial Fever.		Cerebro-spinal Fever.		Tuberculosis.*	
	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.
Namoi	5	...	6	...	33	...	...	...	...	...	2	1	...	...
Narraburra	5	...	4	...	10	...	...	...	...	...	...	...	...	...
Nattai .....	...	...	7	...	...	...	1	...	...	...	1	...	...	...
Nepean	1	...	1	...	...	...	...	...	...	...	...	...	...	...
Nundle	7	...	...	...	3	...	...	...	...	...	1	1	...	...
Nymboida	3	...	5	...	1	...	...	...	...	...	...	...	...	...
Oberon .....	...	...	29	5	10	1	...	...	1	...	...	...	...	...
Orara	1	...	1	...	...	...	...	...	...	...	...	...	...	...
Patrick's Plains .....	...	...	4	...	7	1	...	...	...	...	1	1	...	...
Peel	16	...	6	...	11	...	2	...	...	...	...	...	...	...
Rylstone .....	...	...	9	...	1	1	...	...	...	...	...	...	...	...
Severn	1	...	16	...	12	...	1	...	...	...	1	1	...	...
Stroud .....	...	...	3	...	4	...	...	...	...	...	...	...	...	...
Sutherland .....	...	...	10	...	9	1	2	...	...	...	...	...	...	...
Talbragar	4	...	7	...	15	...	1	...	...	...	1	...	...	...
Tallaganda	2	...	2	...	...	...	...	...	...	...	...	...	...	...
Tamarang	1	...	6	...	11	1	...	...	...	...	3	1	...	...
Tenterfield .....	...	...	...	...	2	...	...	...	...	...	...	...	...	...
Terania .....	...	...	2	...	5	...	1	...	...	...	...	...	...	...
Timbrielbongie .....	...	...	10	...	13	...	...	...	...	...	...	...	...	...
Tintenbar .....	...	...	2	...	6	...	1	...	...	...	1	...	...	...
Tomki	1	...	...	...	20	...	...	...	...	...	...	...	...	...
Tumbarumba	1	...	11	...	4	...	...	...	...	...	1	...	...	...
Turon	8	...	13	...	6	...	1	...	...	...	...	...	...	...
Tweed	6	...	...	...	33	1	...	...	...	...	...	...	...	...
Urana .....	...	...	1	...	2	1	...	...	...	...	...	...	...	...
Wakool	7	...	...	...	1	...	...	...	...	...	1	...	...	...
Walgett	5	...	...	...	...	...	...	...	...	...	...	...	...	...
Wallerobba	2	...	4	...	9	...	...	...	...	...	...	...	...	...
Waradgery	1	...	4	...	...	...	...	...	...	...	...	...	...	...
Warrah .....	...	...	2	...	12	...	...	...	...	...	...	...	...	...
Warringah .....	...	...	1	...	...	...	...	...	...	...	...	...	...	...
Wangoolah	2	...	15	...	28	...	...	...	...	...	...	...	...	...
Weddin	12	...	21	...	57	1	1	...	...	...	4	2	...	...
Winduran .....	...	...	1	...	...	...	...	...	...	...	...	...	...	...
Wingadee .....	...	...	19	1	5	...	...	...	...	...	...	...	...	...
Wingecarribee .....	...	...	3	...	2	...	1	...	...	...	...	...	...	...
Wollondilly	3	...	9	...	20	...	...	...	...	...	...	...	...	...
Woodburn .....	...	...	...	...	8	...	1	...	...	...	...	...	...	...
Woolooma .....	...	...	11	...	1	...	...	...	...	...	...	...	...	...
Wunnumurra .....	...	...	1	...	...	...	...	...	...	...	1	...	...	...
Wyaldra .....	...	1	2	...	1	...	...	...	...	...	...	...	...	...
Yallaro .....	...	...	...	...	4	...	1	...	...	...	...	...	...	...
Yanko	8	...	46	1	16	...	1	...	...	...	...	...	...	...
Yarrolumla .....	...	...	5	1	6	1	...	...	...	...	...	...	...	...
Total	299	12	1,151	21	1,525	53	48	1	2	...	49	18	38	3
Death rate per cent.	4.01		1.82		3.47		2.08		.....		36.73		7.89	

POLICE DISTRICTS.

Balranald .....	...	...	...	...	2	1	...	...	...	...	...	...	...	...
Bourke	3	1	...	...	1	...	...	...	...	...	...	...	...	...
Brewarrina .....	...	...	...	...	1	...	...	...	...	...	...	...	...	...
Broken Hill .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Cobar	1	...	1	...	1	...	...	...	...	...	...	...	...	...
Deniliquin .....	...	...	...	...	...	...	...	...	...	...	1	...	...	...
Hay .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Hillston.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Menindie	1	...	...	...	1	...	...	...	...	...	1	...	...	...
Mitchell.....	4	...	...	...	3	...	...	...	...	...	1	...	...	...
Walgett.....	1	1	...	...	1	1	...	...	...	...	...	...	...	...
Wentworth	1	...	...	...	7	...	...	...	...	...	...	...	...	...
Wilcannia	2	...	...	...	2	...	...	...	...	...	...	...	...	...
Total.....	13	2	1	...	19	2	...	...	...	...	3	...	...	...
Death rate per cent.	15.38		.....		10.52		.....		.....		.....		.....
Outside the State—														
Queensland	1	1	...	...	1	1	...	...	...	...	...	...	...	...
South Australia .....	...	...	...	...	2	...	...	...	...	...	...	...	...	...
Victoria.....	2	1	5	...	35	...	...	...	...	...	3	...	...	...
Total.....	3	2	5	...	38	1	...	...	...	...	3	...	...	...
Death rate per cent.	66.6		.....		2.63		.....		.....		.....		.....

SUMMARY showing number of cases notified and death rate per cent. in each division of New South Wales.

District.	Typhoid Fever.		Scarlet Fever.		Diphtheria.		Infantile Paralysis.		Acute Malarial Fever.		Cerebro-spinal Fever.		Tuberculosis.	
	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.
Metropolitan Combined Sanitary District.	653	74	2,743	38	2,814	129	198	17	58	2	132	72	1,423	621
Hunter River Combined Sanitary District	105	21	209	...	264	19	15	2	...	...	6	5	32	39
Remainder of State:—														
Municipalities	669	98	1,650	48	1,932	105	50	1	1	...	116	50	6	3
Shires	299	12	1,151	21	1,525	53	48	1	2	...	49	18	38	3
Police Districts, &c.	16	4	6	...	57	3	...	...	...	...	6	...	...	...
Total	1,742	209	5,759	107	6,588	309	311	21	61	2	309	145	1,469	666
Death rate per cent.	11.42		1.85		4.68		6.75		3.27		46.92		44.44	

* Notifiable in the Blue Mountain Shire from 2nd October, 1916.

TABLE V.—Showing the seasonal prevalence of Cerebro-spinal Fever (Meningococcal Meningitis), Diphtheria or Membranous Croup, Infantile Paralysis (Acute Anterior Poliomyelitis), Acute Malarial Fever, Scarlat Fever, Typhoid Fever, and Tuberculosis in New South Wales for the year ended 31st December, 1916.

Month, 1916.	Typhoid Fever.						Scarlet Fever.						Diphtheria.																											
	Metropolitan Combined Districts.			Hunter River Combined Districts.			Remainder of State.			Total.			Metropolitan Combined Districts.			Hunter River Combined Districts.			Remainder of State.			Total.																		
	C.		D.	C.		D.	C.		D.	C.		D.	C.		D.	C.		D.	C.		D.	C.		D.																
January	70	19	20	4	137	15	227	38	258	6	15	...	367	11	640	17	234	12	25	2	339	16	598	30																
February	102	8	18	5	171	19	291	32	245	...	22	...	330	5	597	5	270	9	23	...	243	16	596	25																
March	136	12	20	4	179	16	335	32	241	1	14	...	413	6	668	7	419	11	35	1	458	18	912	30																
April	65	9	11	1	153	19	229	29	194	...	19	...	318	6	531	6	330	13	31	2	496	18	767	33																
May	56	5	8	2	102	14	166	21	271	2	11	...	384	9	666	11	306	21	39	5	580	22	925	47																
June	28	2	4	...	56	7	88	9	189	3	8	...	303	13	500	16	230	9	11	1	338	12	579	22																
July	14	5	1	...	23	7	38	13	224	7	10	...	169	4	403	11	171	8	15	1	296	18	482	27																
August	34	1	...	...	12	1	46	2	266	4	6	...	151	2	423	6	203	9	14	3	225	13	442	25														
September	19	1	...	...	16	2	35	3	247	5	31	...	120	7	398	12	264	23	23	3	152	7	439	33														
October	16	2	7	1	21	2	44	5	193	5	27	...	92	4	312	9	128	7	23	...	163	7	314	14																
November	48	3	9	2	45	6	102	11	227	...	27	...	88	1	342	1	114	5	7	...	139	9	260	15																
December	65	7	7	1	69	6	141	14	188	5	19	...	72	1	279	6	125	3	14	...	135	5	274	8																
Totals.....	653	74	105	21	984	114	1,742	209	2,743	38	209	...	2,807	69	5,759	107	2,814	129	260	19	3,514	161	6,588	309																
Death-rate per cent.....	11.33				11.58				1.38				Nil.				2.45				1.85				4.58				7.3				4.58				4.68			
Tuberculosis.																																								
Month, 1916.	Infantile Paralysis.						Malaria.						Cerebro-spinal Meningitis.						Tuberculosis.																					
	Metropolitan Combined Districts.			Remainder of State.			Total.			Metropolitan Combined Districts.			Remainder of State.			Total.			Metropolitan Combined Districts.			Hunter River Combined Districts.			Remainder of State.			Total.												
	C.		D.	C.		D.	C.		D.	C.		D.	C.		D.	C.		D.	C.		D.	C.		D.	C.		D.	C.		D.										
January	41	1										
February	57	2										
March	54	7										
April	21	2										
May	10	1										
June	10	3										
July	1										
August	2										
September	1										
October										
November	1										
December	1										
Totals	198	17	15	2	311	21	58	2	98	2	311	21	58	2	98	2	311	21	58	2	311	21	58	2	98	2	311	21	58	2	98									
Death-rate per cent.	8.58				13.3				2.04				6.75				3.84				3.27				54.54				39.77				13.63				44.44			

TABLE VI.—Showing the number of Cases of Infectious Diseases notified in the State of New South Wales during the years 1898 to 1916, and the number of deaths therefrom.

Year.	Population.	Typhoid Fever.		Scarlet Fever.		Diphtheria.		Plague.*		Infantile Paralysis.†		Malaria.‡		Cerebro-spinal Meningitis.§		Tuberculosis.¶	
		Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
1898	1,323,130	3,302	387	6,342	83	1,493	169	...	...	...	...	...	...	...	...	...	...
1899	1,344,080	2,783	347	1,389	25	741	60	...	...	...	...	...	...	...	...	...	...
1900	1,364,590	3,442	398	895	9	726	63	303	103	...	...	...	...	...	...	...	...
1901	1,376,199	2,702	291	1,288	16	922	131	...	...	...	...	...	...	...	...	...	...
1902	1,397,858	2,624	276	2,010	61	757	74	140	41	...	...	...	...	...	...	...	...
1903	1,416,879	4,855	475	5,358	87	1,214	134	2	...	...	...	...	...	...	...	...	...
1904	1,440,919	2,370	249	4,056	50	1,584	156	12	6	...	...	...	...	...	...	146	...
1905	1,469,153	2,226	239	1,773	21	1,118	102	56	21	...	...	...	...	...	...	128	...
1906	1,498,609	2,373	271	3,085	42	1,219	100	20	8	...	...	...	...	...	...	118	...
1907	1,531,980	1,972	189	2,570	26	1,376	133	51	20	...	...	...	...	...	...	161	...
1908	1,560,026	2,607	307	2,755	40	2,001	123	...	...	...	...	...	...	...	...	112	...
1909	1,596,685	2,615	287	2,178	30	2,419	166	...	...	...	...	...	...	...	...	196	...
1910	1,638,220	2,714	294	1,642	23	4,989	207	...	...	...	...	...	...	...	...	184	...
1911	1,698,735	1,864	184	2,618	11	4,784	226	...	...	...	...	...	...	...	...	222	...
1912	1,778,962	2,126	236	662	11	5,440	253	...	...	...	...	...	...	...	...	265	...
1913	1,832,456	2,187	236	1,120	23	6,380	310	...	...	47	10	...	...	...	...	228	...
1914	1,862,028	2,284	250	3,207	21	5,831	247	...	...	79	14	...	...	...	...	293	...
1915	1,868,644	1,941	219	8,335	97	5,838	264	...	...	63	11	105	2	50	33	361	86
1916	1,846,736	1,742	209	5,759	107	6,588	309	...	...	311	21	61	2	309	145	1,499	666

City of Sydney only.

* Notifiable from 23rd January, 1900.

† " 1st February, 1912.

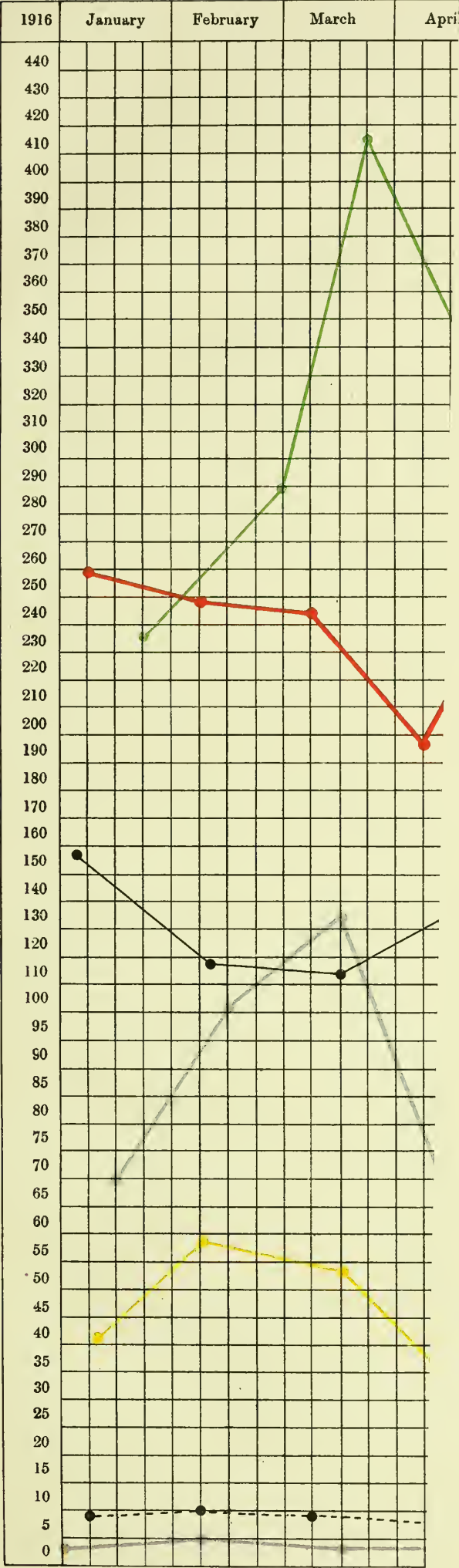
‡ " 17th March, 1915.

§ " 11th October, 1915.

¶ " 18th October, 1904, in the city of Sydney only; from 11th August, 1915, in the Metropolitan and Hunter River Districts; and in the Katoomba Municipality and Blue Mountain Shire, from 2nd October, 1916.

Diagrams are appended showing the monthly incidence of the diseases above mentioned.

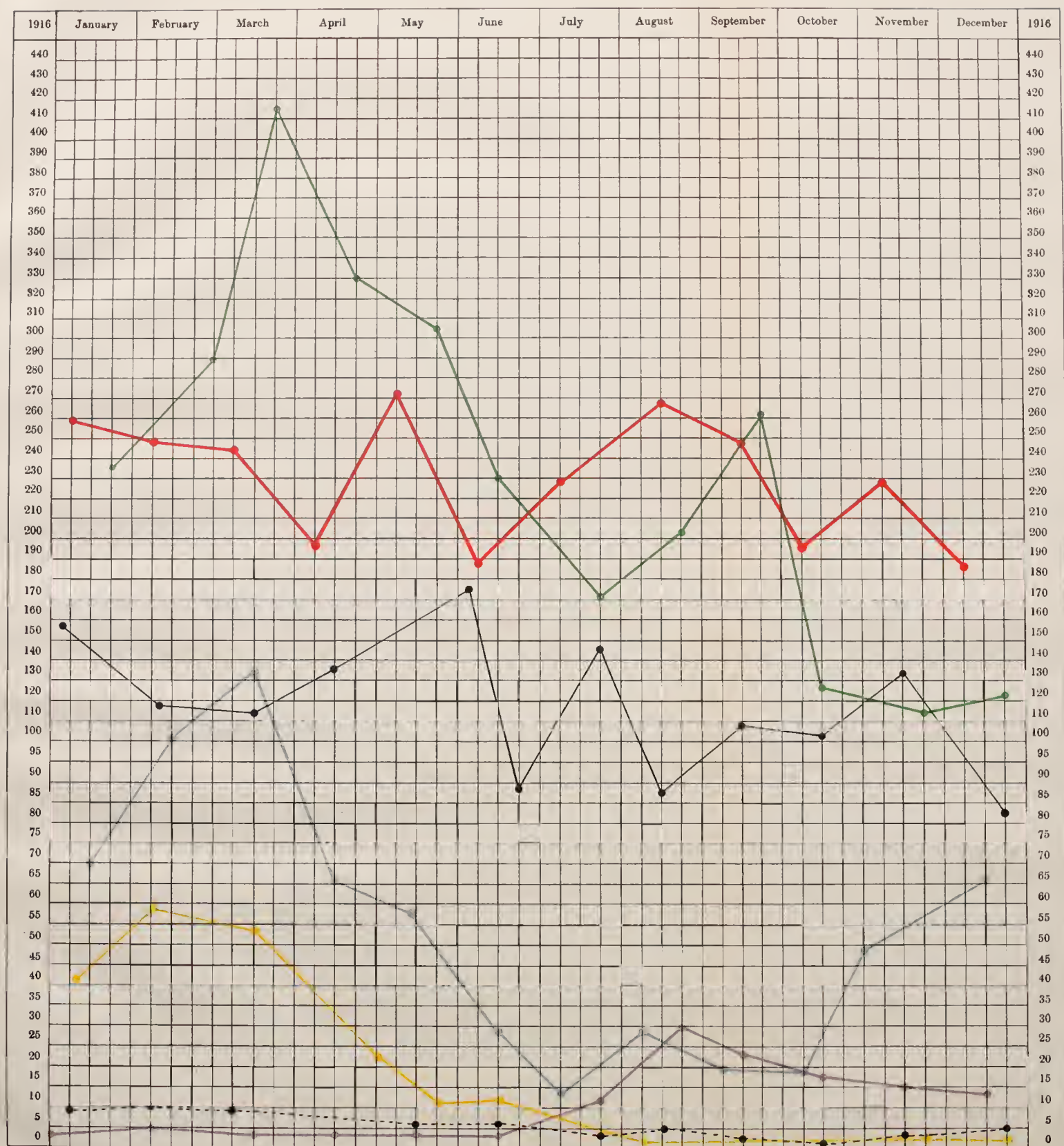
DIAGRAM showing the



N.B.—Scarlet Fever—"Red."
Diphtheria—"Green."
Typhoid Fever—"Blue."
Tuberculosis—"Black."
Cerebro-spinal Meningitis—"Purple."
Malaria—"Black dotted."
Infantile Paralysis—"Yellow."

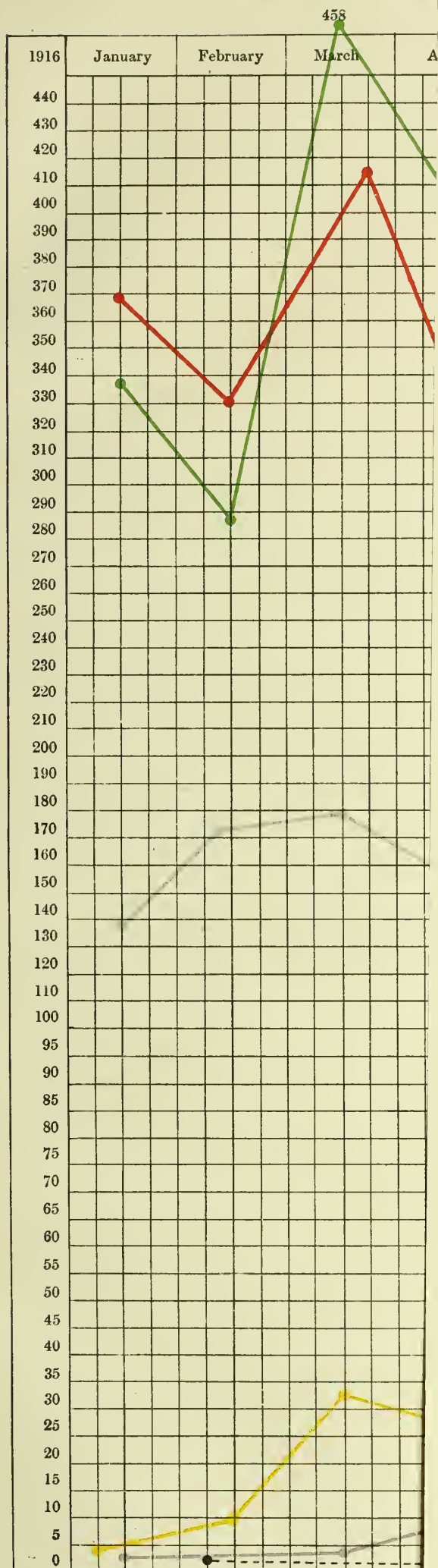
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MAY 1916

DIAGRAM showing the Monthly Numbers of Notifications of Infectious Diseases in the Metropolis during 1916.



N.B.—Scarlet Fever—"Red."
 Diphtheria—"Green."
 Typhoid Fever—"Blue."
 Tuberculosis—"Black."
 Cerebro-spinal Meningitis—"Purple."
 Malaria—"Black dotted."
 Infantile Paralysis—"Yellow."

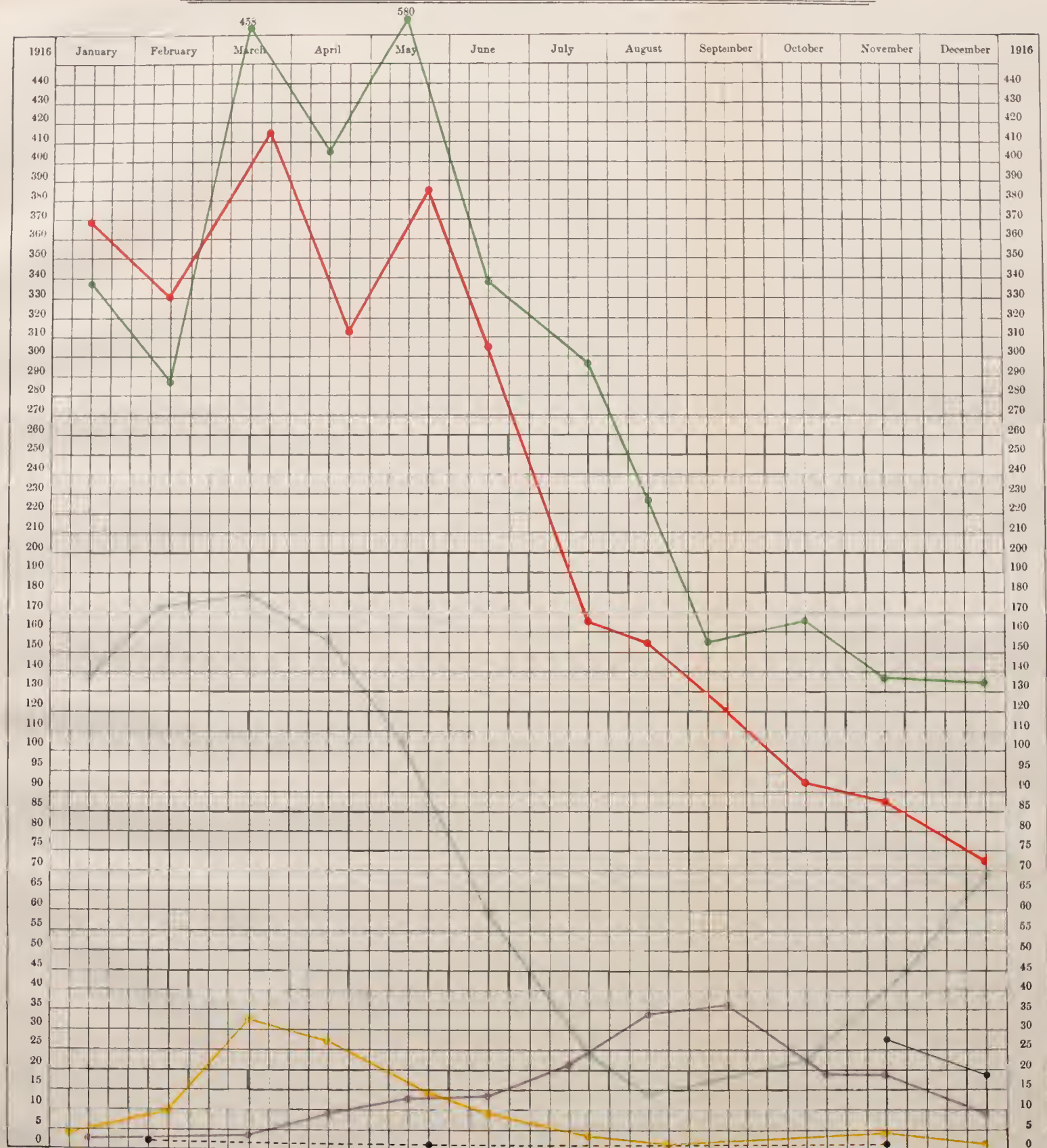
DIAGRAM showing the M



N.B.—Scarlet Fever—"Red."
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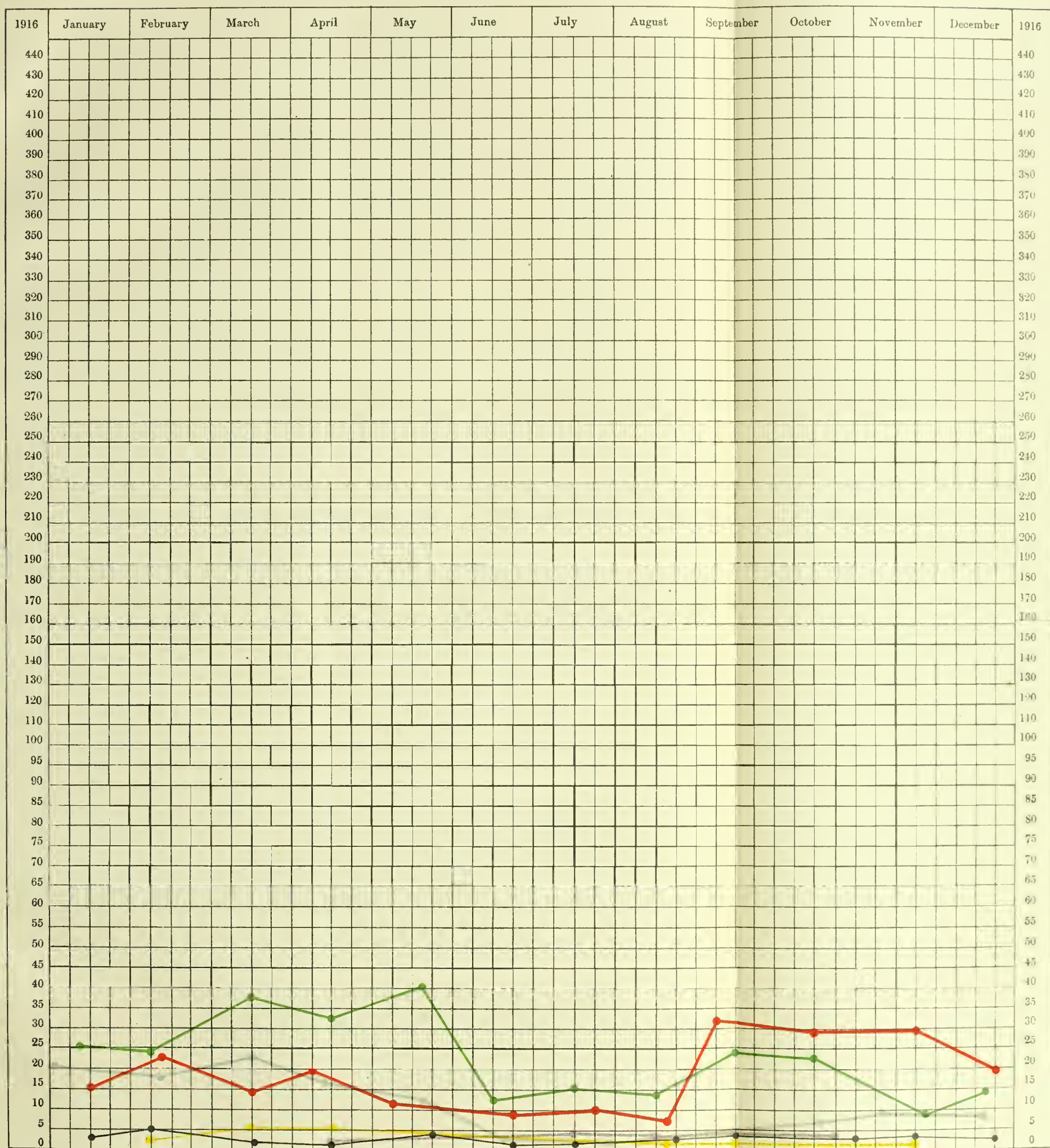
DIAGRAM showing the Monthly Numbers of Notifications of Infectious Diseases in the remainder of State during 1916.



N.B.—Scarlet Fever—"Red."
 Diphtheria—"Green."
 Typhoid Fever—"Blue."
 Tuberculosis—"Black."
 Cerebro-spinal Meningitis—"Purple."
 Malaria—"Black dotted."
 Infantile Paralysis—"Yellow."

(Notifiable from 2nd October, 1916, in Katoomba M. and Blue Mountains S.)

DIAGRAM showing the Monthly Numbers of Notifications of Infectious Diseases in the Hunter River Combined District during 1916.



N.B.—Scarlet Fever—"Red."
Diphtheria—"Green."
Typhoid Fever—"Blue."
Tuberculosis—"Black."
Cerebro-spinal Meningitis—"Purple."
Infantile Paralysis—"Yellow."

HOSPITAL ADMISSION DEPÔT.

REPORT OF THE GOVERNMENT MEDICAL OFFICER FOR SYDNEY FOR THE
YEAR ENDED 31st DECEMBER, 1916.

Medical Staff:

Dr. ARTHUR A. PALMER, First Government Officer for Sydney.
Dr. A. C. CAHILL, Second Government Officer for Sydney.

Clerical Staff:

DANIEL FRAZER HAYWARD, Dépôt Clerk.
EDGAR GEORGE PARTRIDGE, Statistical Clerk.
ARTHUR PAYNE, Dépôt Attendant.
NORMAN LOGAN, Messenger.

Among the various calls made upon Dr. Cahill and myself, the following branches of work may be specially referred to:—

Hospital Admission Dépôt.—The Government Medical Officers attended each morning from 9 to 12.30 to carry out examinations of indigent sick persons who were seeking admission to the various hospitals and institutions, and when necessary the destitute sick were visited in their own homes before being transferred to a hospital. Some idea of the volume and scope of the work may be gathered from the following figures:—The number of persons applying at this dépôt for admission to the hospitals and asylums showed a decrease of 1,068 upon the applicants for 1915—12,084 presenting themselves for examination as against 13,152 in the previous year. The ages of applicants ranged from under 5 years to over 60 years, and there were representatives of every nationality. Three thousand four hundred and twenty-six persons were sent to the Coast Hospital at Little Bay (the departmental General Hospital), 436 to the Royal Prince Alfred Hospital, 267 to the Sydney Hospital, 172 to the Women's Hospital, 117 to the Hospice for the Dying, and 6,277 were admitted to one or other of the State hospitals and asylums.

The number of persons applying for orders for treatment as out-door patients showed a decrease on the previous year—1,000 orders being issued as compared with 1,457 in 1915; 130 persons were sent to the convalescent hospitals at Rose Bay ("Carrara"), Eastwood ("Denistone House"), and the Carrington Convalescent Home at Camden.

Length of Residence in New South Wales.—Of the 12,084 persons attending at the dépôt, 7,083 were born in New South Wales; 3,135 had been resident in the State more than twenty years; 350 between ten and twenty years; 416 between five and ten years; 839 between one and five years, while 261 had been less than twelve months.

Ages.—Arranged in 10-year age groups, the greatest number of applicants amongst the 12,084 claimed to be over 60 years, namely, 2,754; 1,880 were between 50 and 60, 1,448 between 40 and 50, 1,478 between 30 and 40, 1,854 between 20 and 30, 930 between 10 and 20, 762 between 5 and 10, and 990 under five years.

Nationality.—Of the total number, 12,084, those born in Australasia numbered 7,988, distributed as follows:—New South Wales, 7,083; Victoria, 455; Queensland, 122; New Zealand, 123; South Australia, 75; Tasmania, 130; and, as in 1915, West Australia was not represented. Other countries were: England, 2,057; Scotland, 521; Ireland, 997; France, 48; Germany, 23; Italy, 26; Norway, Sweden, and Denmark, 162; other Europeans, 89; India, 37; China, 29; other Asiatics, 10; Canada, 34; United States of America, 45; and Africa, 18.

Occupations.—Labourers 2,779, gardeners 97, carpenters 100, painters 88, bricklayers 37, brickmakers and quarrymen 5, miners 60, engineers 152, blacksmiths 52, printers 39, seamen 274, clerks 153, tailors 78, butchers 28, grocers 5, bootmakers 86, carters 156, dealers 96, cooks, bakers, &c. 196, servants 1,177, married women 1,309, no occupation 5,117.

Examinations for the Public Service.—In addition to the work indicated above, examinations were made of candidates for appointment to the Public Service, of whom 834 presented themselves. Any special medical examinations required in connection with Public Servants, such as for retirement or other special purposes, were also undertaken by us.

Factories Acts.—Medical examinations required for the purposes of the Factories Acts were also made, and numbered 3,035 as compared with 3,296 in 1915. The majority of the examinees were young persons seeking age-exemption certificates, or permits to work at certain trades.

Vaccinations were carried out daily at this dépôt.

City Coroner.—At the request of the City Coroner, 230 bodies were examined. Evidence was given at the Coroner's Court in connection with 48 of the deaths, and in 3 cases at the Central Criminal Court.

Medico-Legal.—Examinations were made in sixty-seven cases of alleged rape and indecent assault, and of clothing and other exhibits in criminal cases. Where necessary, evidence was subsequently given at the Children's and other Courts to assist the Crown Law Officers. All medico-legal cases pass through the hands of the Government Medical Officers before being sent to the Government Analyst, the Microbiological Laboratory, or other Departments for further examination.

Evidence

Evidence was also given in the Courts in connection with action taken by the Department under the Pure Foods Act, in relation to false claims in respect of certain proprietary preparations, &c.

Police Department.—404 candidates for the police force were examined, of whom 228 were successful; 108 probationers were re-examined at the end of twelve months' service, and of these 105 passed into the Force as fit.

All members of the Police force on the sick list were seen daily at the office of the Inspector-General of Police. The average daily number was 32·2.

Prisons Department.—The Long Bay Penitentiary has been visited from time to time for the purpose of certifying lunatics, or for examining prisoners for the purpose of subsequently giving evidence at the Courts. For some time past arrangements have been made whereby prisoners charged with capital offences, or with any serious offence, in which the question of insanity may arise, are brought before the Government Medical Officers for examination as soon as possible after arrest. In addition, prisoners brought before the Courts about whom there was any doubt as to their fitness to travel to Long Bay were examined.

Lunacy Cases.—The Reception House at Darlinghurst was visited daily, and during the year 642 patients were certified as insane.

Miners' Accident Relief Board.—The meetings of this Board were attended for the purpose of assisting with advice, and special examinations were carried out for the Board as required where necessary—many in consultation with other medical men.

Navigation Department and Shipping Master's Office.—The Government Medical Officers for Sydney examine the harbour and sea pilots of Port Jackson, and several examinations were made in this connection during the year under review, as well as the ordinary medical re-examinations.

In every case where any doubt arose as to whether a seaman's ill-health would prevent him undertaking the return voyage to a distant port, he was sent by the Shipping Master to the Government Medical Officers for examination.

Claims for Injuries, &c.—In accident cases where legal action may be taken against the Government, the patients are examined, usually in consultation with their own medical advisers, and reports made.

From time to time country centres are visited in connection with accident cases or to hold investigations into hospital disputes, &c.

MOTOR AMBULANCE SERVICE.

As mentioned in the Reports for previous years, the ambulance service is a very important adjunct of the Hospital Admission Depôt. The amount of work carried out by the two motor ambulances attached to the Depôt is shown in the following table:—

Motor Ambulances.	No. of Patients removed.	Miles travelled.	Hours occupied.
No. 2 (823)	1,145	12,751	2,367
,, 3 (10,383)	1,143	12,759	2,376
Total	2,288	25,510	4,743

DISINFECTING AND FUMIGATING STATION, WOOLLOOMOOLOO BAY.

The Disinfecting and Fumigating Station at Woolloomooloo Bay is of great service in connection with the work of the Hospital Admission Depôt. The motor ambulances are disinfected there daily, and sometimes two or three times each day when a number of infectious cases require removal. Cabs and other vehicles to the number of 89, in which infectious diseases had been taken to hospital, were also treated there during the year.

Twenty-three tunics and 183 pairs of trousers were disinfected for the Military authorities.

ARTHUR A. PALMER,

First Government Medical Officer for Sydney.

SUMMARY OF QUARTERLY REPORTS.

The provisions of the Public Health Act, 1902, and Regulations thereunder require Local Authorities to submit quarterly reports respecting the health of their districts. These reports have been summarised in the following tables:—

SUMMARY

SUMMARY of Quarterly Returns from Local Authorities—continued.

II.—Abstract of Reports made by Local Authorities in the remainder of New South Wales. Number of Municipalities, 119; of Shires, 126; of Police Districts, 11. Estimated Population, 1,009,015.

Part III. Infectious Diseases.										Disinfection.		Prevention of Infectious Disease.					Common Lodging-houses.		Part VI. Buildings.		Part VII. Nuisances.				Part VIII. Polluted Water Supply.		Legal Proceedings taken.						
No. of Notifications received.										Total.		No. of Premises disinfected by L. A.					No. of District.		No. of Dwelling-houses inspected under Part VI.		No. of Complaints of nuisance received.		No. of Notices to abate issued under Sec. 65.		No. of Cesspits in District.		No. of sources of polluted water supply closed during Quarter.		No. of Prosecutions		No. of Convictions		
												No. of Articles destroyed by L. A.					No. of Cases in which special pull service was provided for removal of typhoid excreta.		No. of Notices served on Householders.		No. of Notices served on School Teachers.		No. of Prosecutions for exposure of infected persons or articles.		Total No. of Visits of Inspector.								
												Medical Practitioners.					Total.		No. of Articles destroyed by L. A.														
												No. of Premises disinfected by L. A.							No. of Notices served on Householders.														
												No. of Premises disinfected by L. A.							No. of Notices served on Householders.														
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STATEMENT of Municipalities and Shires who reported 25 cases and over of Infectious diseases in any one quarter during the year 1916.

District.	1st Quarter.					2nd Quarter.					3rd Quarter.					4th Quarter.					Total for Year.					Population, 31st December, 1916.										
	Cerebro-Spinal Meningitis.	Infantile Paralysis.	Malaria.	Scarlet Fever.	Diphtheria.	Typhoid Fever.	Total.	Cerebro-Spinal Meningitis.	Infantile Paralysis.	Malaria.	Scarlet Fever.	Diphtheria.	Typhoid Fever.	Total.	Cerebro-Spinal Meningitis.	Infantile Paralysis.	Malaria.	Scarlet Fever.	Diphtheria.	Typhoid Fever.	Total.															
Municipalities.																																				
METROPOLITAN COMBINED SANITARY DISTRICTS.																																				
Sydney, City of	17	1	74	155	25	272	2	1	6	43	95	8	155	2	4	76	90	6	176	..	..	..	43	28	30	101	2	18	11	236	368	69	704	106,000
Alexandria	3	..	9	7	50	69	4	12	15	31	4	9	5	20	1	4	7	..	5	..	95	29	74	127	11,410	
Annandale	1	1	4	23	2	30	11	9	..	20	14	14	1	29	6	2	1	..	35	48	3	87	12,400	
Ashfield	11	11	33	10	5	60	..	5	22	21	2	50	..	..	..	27	6	1	34	..	..	..	27	5	2	35	1	16	1	100	42	10	179	27,680
Balmain	6	..	15	31	3	55	..	3	37	23	3	71	..	..	1	36	23	1	61	1	1	1	27	5	2	33	1	11	1	190	94	15	229	33,250
Bexley	5	..	11	8	1	25	..	..	19	15	1	35	..	..	..	Did not report.	..	..	..	..	..	..	65	10	..	75	..	5	..	95	33	2	135	10,660
Botany	1	1	7	4	28	40	..	..	3	8	8	19	..	..	1	1	6	11	19	..	..	..	..	1	1	..	..	..	..	1	18	48	79	5,670
Canterbury	5	..	38	95	3	141	..	2	17	54	..	73	2	24	27	1	54	9	14	1	21	2	7	..	88	190	5	292	25,470	
Drummoyne	1	1	18	6	3	28	10	8	4	22	1	7	5	2	15	1	4	5	2	12	2	1	..	39	24	11	77	13,550	
Glebe	2	..	30	32	7	71	..	1	23	41	3	68	..	..	..	18	24	4	46	..	..	..	22	13	9	44	..	2	1	93	110	23	229	22,690
Hurstville	3	..	14	10	2	29	..	2	7	6	1	16	3	11	1	15	6	1	..	7	3	4	2	16	1	27	17	3	67	10,510
Kogarah	2	..	20	10	7	41	11	15	2	24	2	10	5	1	18	30	4	1	..	34	3	2	..	71	34	10	121	12,550	
Leichhardt	3	..	29	27	7	66	..	..	16	27	1	43	2	..	..	48	17	2	69	1	..	..	11	11	2	25	3	3	..	104	82	11	203	27,760
Lidcombe	1	1	3	2	1	7	..	1	1	11	10	1	24	15	21	..	36	2	11	7	2	22	..	3	3	3	40	40	4	89	7,950	
Marily	6	..	15	11	1	33	..	1	10	8	5	24	2	1	..	6	6	1	16	1	1	4	3	9	3	..	8	..	32	29	10	82	13,930	
Marrickville	8	2	43	75	..	123	..	2	1	47	54	2	106	40	34	..	74	2	1	36	11	4	54	2	10	41	166	174	6	362	35,000	
Mascot	..	..	6	4	10	20	..	1	10	11	8	30	1	..	..	2	3	..	6	..	1	..	1	3	2	7	1	2	..	19	21	26	67	37,370
Mosman	1	..	7	5	1	14	..	..	18	4	4	26	..	..	..	16	8	..	24	..	..	..	25	7	3	37	6	6	..	104	113	19	248	16,990
Newtown	4	..	35	54	6	93	1	2	23	23	9	58	3	..	..	21	29	1	54	2	..	..	19	5	6	31	2	8	1	62	60	13	146	27,820
North Sydney	5	1	18	16	3	43	..	3	12	25	2	42	1	..	..	13	14	2	30	1	..	..	19	5	6	31	2	8	1	62	60	13	146	27,820
Paddington	7	..	2	20	3	32	..	..	11	29	2	42	3	..	..	6	25	..	34	..	..	..	10	13	7	30	3	7	..	29	87	12	134	40,930
Parramatta	1	..	26	23	6	56	..	..	14	21	5	40	..	..	..	11	25	..	36	..	..	..	18	16	..	34	..	1	..	69	85	11	166	25,870
Petersham	9	..	27	13	12	61	..	2	23	21	10	56	2	..	..	21	13	2	38	1	..	..	12	8	10	31	3	11	..	83	55	34	186	23,830
Randwick	13	..	315	444	51	823	2	4	1206	414	16	643	7	..	..	265	801	9	582	9	1	..	228	151	5	394	18	18	1	1,014	1,810	81	2,442	32,910
Redfern	7	..	17	26	15	65	2	2	15	15	8	42	2	..	..	25	20	3	50	3	..	..	21	12	19	46	7	9	..	78	73	36	203	25,010
Rockdale	3	..	11	8	9	31	..	..	7	16	..	23	4	..	..	40	9	..	53	1	..	..	51	6	..	58	5	2	..	109	39	9	165	19,900
Ryde	..	..	22	15	3	40	..	2	12	9	1	24	..	..	..	5	8	..	13	..	..	..	3	3	6	12	1	3	..	42	35	10	89	9,240
St. Peters	1	2	3	26	3	35	..	..	14	19	1	34	..	1	..	7	13	1	22	..	..	..	8	4	1	13	1	2	..	32	62	6	104	10,610
Waterloo	4	..	2	8	21	35	..	1	7	10	12	30	2	..	..	13	6	2	17	..	..	..	18	6	4	1	2	3	..	34	30	42	113	11,190
Waverley	..	..	32	22	5	59	..	..	11	16	3	30	..	..	..	13	6	2	21	3	..	..	6	8	2	10	3	..	..	62	52	12	129	27,480
Willoughby	4	..	25	31	6	66	..	2	28	30	12	72	..	..	..	19	24	1	44	..	..	..	14	14	2	30	..	5	..	86	99	21	212	20,840
Woollahra	4	..	12	15	3	34	..	1	10	9	1	21	3	6	1	10	1	8	..	5	1	26	36	5	73	20,280	
Shires.																										59	23	4	91	12,150						
Hornsby	3	..	8	8	1	20	..	1	17	8	..	26	1	..	..	26	4	1	32	..	..	..	8	3	2	13	1	4	..	59	23	4	91	12,150
Ku-ring-Gai	3	..	16	9	4	32	..	..	8	4	4	16	1	..	..	5	4	..	10	..	1	..	3	7	1	12	1	4	..	32	24	9	70	14,340
																										727,109										
Municipalities.																																				
HUNTER RIVER COMBINED SANITARY DISTRICTS.																																				
Wallsend	..	..	2	9	7	18	..	1	..	3	20	1	25	..	..	1	2	..	3	..	..	..	..	2	1	3	..	1	..	6	33	9	49	5,730
West Maitland	1	..	11	13	8	33	..	..	8	8	10	26	2	1	..	4	5	2	14	..	..	..	..	8	5	13	2	2	..	23	34	25	86	8,400
Shires.																																				
Cessnock	7	9	13	29	1	2	7	6	16	2	1	..	29	15	..	47	1	56	8	7	72	4	1	..	94	39	26	164	26,650	
																										40,780										
Municipalities.																																				
THE REMAINDER OF THE STATE																																				
Albury	..	..	21	34	14	69	..	..	16	27	4	47	4	..	..	6	18	..	28	1	..	..	4	8	1	14	5	..	..	47	87	19	158	6,350
Armidale	44	9	1	54	13	18	1	32	5	18	..	23	15	3	..	20	..	9	..	62	45	2	109	5,100	
Bathurst	1	..	23	27	22	73	..	1	8	39	12	60	..	5	..	18	11	1	35	4	1	9	..	64	80	36	183	8,450	
Broken Hill	..	..	7	111	39	158	2	..	17	198	48	265	6	..	..	14	133	8	161	5	..	..	3	78	46	132	13	1	..	41	520	141	716	26,200
Casino	..	..	11	3	14	..	..	..	29	1	30	..	..	..	..	3	11	1	15	..	..	..	..	3	3	6	..	..	..	3	68	7	78	4,150
Cooma	..	..	3	3	6	..	..	..	11	17	..	28	..	..	..	2	2	..	4	..	..	..	..	3	3	6	..	..	..	19	2	..	4	1,900
Cootamundra	..	..	14	1	15	..	..	..	52	5	..	57	..	..	..	5	2	..	7	..	..	..	8	4	1	13	..	..	..	79	12	1	92	2,500
Corowa	..	..	26	6	11	43	2	..	16	6	4	28	9	..	..	17	2	..	28	3	..	..	2	1	2	8	14	..	..	61	15	17	107	3,100
Cowra	..	..	14	16	1	31	..	..	6	6	..	12	..	..	..	..	3	..	3	1	..	..	..	3	4	1	..	..	..	20	28	1	50	2,100
Dubbo	1	..	14	16																																

EXHUMATION OF BODIES, AND BURIALS IN CLOSED CEMETERIES.

Supervision of these matters, formerly in the hands of the Lands Department, was transferred to the Board of Health as from 1st January, 1906.

The following table shows the permits issued for exhumations, and for burials in closed cemeteries, each year from 1906 to 1916, both inclusive :—

Year.	Exhumation Permits Granted for—					Permits granted to bury in closed cemeteries.	Year.	Exhumation Permits Granted for—					Permits granted to bury in closed cemeteries.
	Re-interment in same cemetery. N.S.W.	Re-interment in distant cemetery. N.S.W.	Return of remains to China.	Return of remains to other countries.	Total.			Re-interment in same cemetery. N.S.W.	Re-interment in distant cemetery. N.S.W.	Return of remains to China.	Return of remains to other countries.	Total.	
1906	43	27	124	2	195	11	1913	91	41	37	3	172	2
1907	50	52	44	2	148	4	1914	97	65	80	6	248	6
1908	49	30	8	3	90	9	1915	84	35	43	1	163	2
1909	70	36	15	2	123	7	1916	133	29	53	1	216	3*
1910	82	35	13	1	131	7	Total...	836	436	584	23	1,879	64
1911	62	34	80	1	177	3							
1912	75	52	87	1	215	10							

* One burial in Broken Hill Cathedral.

PART II.

1.—Metropolitan Combined Sanitary Districts.

Report of the Acting Medical Officer of Health (Dr. F. M. SUCKLING) for 1916.

2.—Hunter River Combined Sanitary Districts.

Report of the Acting Medical Officer of Health (Dr. J. BOOTH-CLARKSON) for 1916.

3.—Broken Hill and District.

Report of the (Part time) Medical Officer of Health (Dr. J. F. BARTLEY), for 1916.

PART II.

I.—Metropolitan Combined Sanitary Districts.

Report of the Acting Medical Officer of Health for the
Year 1916.

F. M. Suckling, M.B., Ch.M., D.P.H. (Syd.), D.T.M. & H. (Camb.), to the Local
Sanitary Authorities of the Metropolitan Combined Districts of Sydney.

159 Queen Victoria Markets, George-street, Sydney.

I HAVE the honor to present the Report on the conditions as to health of the sanitary districts of the Metropolis of Sydney for the year 1916.

Dr. Purdy, Medical Officer of Health, is still absent on active service.

This report herewith submitted is considerably curtailed in compliance with a general request from the Government urging that the utmost economy in the matter of printing should be observed. Accordingly it will be found that the report consists for the most part of a series of tables of vital statistics, which I deem the most important part of the annual report, in that comparison of records with previous years may be maintained.

The health experience of Sydney, as gauged by the morbidity and mortality returns for the year 1916, may be considered satisfactory, the death rate being 10.24 per 1,000 of the population. This rate is below the average of the preceding five years, which were all years of low mortality.

The deaths of children under one year of age within the Metropolitan area totalled 1,389, or 67 per 1,000 births. This rate is most satisfactory, being the lowest on record, and is 7 per cent. below the average of the previous five years—all years of exceptionally low infantile mortality.

During the early months of the year fifteen cases of the mild type of smallpox prevalent since 1913 were reported in the Metropolitan area. The disease now appears to have been stamped out in this portion of the State. Scarlet fever was not nearly so prevalent during the current year as in 1915, but diphtheria was slightly more so.

The number of notifications of typhoid received showed a drop of 133 cases compared with the previous year.

The most noticeable features of the year with regard to infectious diseases were the epidemics of acute anterior poliomyelitis and cerebro-spinal meningitis, which are dealt with under their respective headings in this report.

Whooping-cough was widely prevalent in the Metropolitan area, resulting in 103 deaths, but the epidemic of measles noted in 1915 showed a marked decline.

POPULATION.

The district included within the Metropolitan combined sanitary districts is considered under three heads:—

1. Sydney and suburbs, which includes the City of Sydney and forty suburban municipalities, and one shire (Kuring-gai).
2. The extra Metropolitan municipalities: Anburn, Bankstown, Cabramatta and Canley Vale, Dundas, Ermington and Rydalmere, Granville, Lidcombe, Liverpool, Parramatta, Prospect and Sherwood, Smithfield and Fairfield.
3. The shires of Warringah and Hornsby (Ridings B and C only in each shire).

The shires of Warringah and Hornsby are not dealt with statistically, and the extra Metropolitan municipalities are separately treated for the Metropolis statistically.

The

The population of the Metropolis proper (Sydney and suburbs) was estimated by the Government Statistician to be 764,600 on December 31st, 1916, of which the City of Sydney contained 106,000, and the suburbs (including the shire of Kuring-gai) 658,600.

The mean population for the year was estimated to be 763,800. In this report the estimated population figures have only been departed from in the municipalities of Hunter's Hill and Leichhardt, since each contains large mental hospitals. As in former reports, deaths among inmates of these hospitals have been distributed to the districts in which they had previously resided, and consequently it was necessary to exclude such inmates from the estimate of the population. The hospitals in question were Gladesville (1,257 inmates) and Callan Park (992 inmates).

BIRTHS.

According to the Government Statistician, the number of births registered in the Metropolis during the year was 20,856, equivalent to a rate of 27·31 per 1,000 of the population. The number of births was fifteen below that of the year 1915, which was the highest ever recorded in the Metropolis. The rate is 4 per cent. below the average of the preceding five years, and is the lowest since 1910.

The number of illegitimate children born during the year was 1,334, or 6·40 per cent. of the total births, and equivalent to 1·75 per 1,000 of the population. Of these children, 57·6 per cent. were born in public institutions.

DEATHS.

The recorded deaths of residents in the Metropolis, after correction for institutions, totalled 7,800, equivalent to a rate of 10·24 per 1,000 of the population. This rate is 2 per cent. below the average of the previous five years.

These figures do not include deaths of former Metropolitan residents which occurred in the Benevolent Asylums of Liverpool, Parramatta, Rookwood, and Newington.

It has been found to be impossible to obtain correct addresses of the deceased inmates before they enter these institutions, yet such deaths cannot be entirely ignored in the estimation of mortality figures, since some proportion of the inmates previously resided in Sydney and suburbs.

It is considered, however, possible to make due corrections for such deaths by multiplying the number of recorded deaths of residents by a factor obtained by dividing the total deaths in New South Wales by the total deaths less institution deaths.

The recorded death rate for the Metropolis when thus corrected for institutional deaths becomes increased from 10·24 as given above to 10·88 per 1,000.

For individual diseases the requisite correction is more complicated, and has not been applied except with regard to pulmonary tuberculosis (for which see under the heading of Tuberculosis).

Diseases of the heart and blood vessels (including cerebral hæmorrhage) accounted for 1,426 deaths in 1916. Cancer caused 649 deaths, pneumonia 569, Bright's disease 476, and diarrhæal diseases 514 deaths.

The recorded number of deaths from certain diseases will be found given in various tables in this report, and more particularly in Table XIII.

In some cases the figures differ from those supplied by the Government Statistician, for reasons mentioned in previous annual reports.

An examination of Table I shows that the highest death-rate for all causes was experienced in the municipality of Homebush, where 19·42 deaths per 1,000 of the population were recorded. Among municipalities with more than 10,000 residents, the City of Sydney, with 14·07 deaths per 1,000, Paddington (13·4), Burwood (12·2), and Redfern (11·53) had the highest general death rates. To Ryde, with a population of 9,200 and a density of 1·3 per acre, Concord, with a population of 6,410 and a density of 2·4 per acre, and Drummoyne, with a population of 13,550 and a density of 7·1 per acre, were credited the lowest death rates, viz., 6·2, 6·86, and 7·16 per 1,000 respectively. Of the extra Metropolitan districts, Lidecombe and Parramatta experienced the highest death-rate and Ermington and Rydalmere the lowest.

TABLE 1.

SHOWING Population, density of Population, and certain Death-rates in the Municipalities of the Metropolitan Combined Sanitary Districts for 1916, including deaths which have occurred in General Hospitals, Special Hospitals for Consumption, and Hospitals for the Insane. Deaths in Hospitals have been distributed to their proper districts before calculating these rates.

District.	Estimated Mean Population.	Density of Population to the Acre.	Death-rates per 1,000 of Population.					Infantile Death-rate per 1,000 Births.
			All Causes.	Diarrhoeal Diseases, including Enteritis.	Principal Zymotic Diseases except Diarrhoea.	Phthisis.	All Tubercular Diseases.	
City of Sydney	105,100	36·3	14·07	·77	·49	1·13	1·24	79
Alexandria	11,500	11·2	10·43	1·39	1·74	·43	·52	140
Annandale	12,500	34·7	9·20	·96	·48	·72	·72	58
Ashfield	27,650	13·3	8·50	·29	·33	·76	·76	50
Balmain	31,540	35·8	10·05	·66	·78	·63	·72	87
Bexley.....	10,540	5·5	7·69	·47	·38	·57	·57	66
Botany	5,690	2·6	10·19	1·58	1·05	·18	·35	93
Burwood	12,560	12·0	12·26	1·04	·48	1·11	1·43	69
Canterbury	24,930	3·0	9·83	·96	·36	·60	·68	61
Concord	6,410	2·4	6·86	·31	·47	·47	·47	79
Darlington.....	3,880	88·2	8·76	·77	1·03	·52	·52	151
Drummoyne.....	13,550	7·1	7·16	·37	·30	·37	·44	65
Eastwood.....	1,410	0·5	16·31	1·42	...	1·42	1·42	44
Enfield	5,630	3·3	8·53	1·07	·53	·71	·71	40
Erskineville.....	7,740	46·6	10·59	·78	1·03	·65	·90	104
Glebe.....	22,900	44·0	10·52	·92	·79	·57	·70	81
Homebush	1,030	1·6	19·42	...	...	...	...	...
Hunter's Hill	4,483	3·4	14·28	1·56	1·56	·45	·45	67
Hurstville	10,470	1·6	10·60	·86	·38	·48	·57	59
Kogarah	12,460	2·8	9·15	·56	·64	·40	·40	43
Lane Cove	4,910	2·0	8·76	·61	·20	·61	·81	66
Leichhardt	21,928	23·1	8·84	·78	·52	·48	·52	58
Manly.....	13,940	5·7	10·40	·22	·36	·50	·65	45
Marriekville	37,470	18·6	9·79	·64	·61	·48	·53	61
Mascot	8,600	3·8	9·42	1·74	·70	·23	·35	84
Mosman	17,030	8·2	7·87	·18	·23	·53	·59	43
Newtown	28,030	63·4	10·88	·78	·50	·96	1·11	73
North Sydney.....	41,090	19·9	9·17	·44	·24	·46	·54	58
Paddington	26,110	64·8	13·40	·69	·42	·88	·96	58
Petersham	24,010	19·1	9·79	·67	·33	·54	·54	71
Randwick	32,560	4·0	9·18	·43	·37	·46	·64	67
Redfern	25,240	58·0	11·53	1·11	·63	·63	·87	91
Rockdale	19,890	4·0	8·35	·60	·45	·40	·45	48
Ryde	9,200	1·3	6·20	·22	·22	·43	·54	68
St. Peters.....	10,680	11·9	9·74	1·31	·56	·47	·56	109
Strathfield	5,560	3·1	9·35	·72	·36	·54	·54	70
Vaucluse	2,470	3·2	8·50	·40	·40	·40	·40	41
Waterloo.....	11,270	14·0	11·45	·89	·80	·62	·89	95
Waverley.....	27,400	13·9	8·36	·29	·36	·47	·55	35
Willoughby	20,720	3·7	8·69	·34	·43	·53	·63	51
Woollahra	20,270	10·5	9·27	·64	·30	·35	·39	85
Shire of Ku-ring-gai	14,200	0·6	7·54	...	·49	·56	·56	27
Whole Metropolis	761,551	6·4	10·24	·67	·50	·64	·73	67
Auburn	10,790	4·0	7·97	·65	·28	·19	·19	75
Bankstown	5,320	0·3	5·64	·19	...	1·32	1·32	14
Cabramatta and Canley Vale	1,600	0·2	10·00	·25	...	·12	·12	48
Dundas	1,630	0·6	10·43	1·23	·61	...	...	242
Ermington and Rydalmere	1,730	0·8	3·47	1·16	...	...	...	62
Granville.....	11,070	2·7	8·31	1·26	·27	·36	·36	81
Liverpool	7,940	0·2	5·04	·63	·13	·25	·25	60
Lidcombe.....	3,940	0·7	15·99	1·52	·51	2·03	2·03	75
Parramatta	12,370	5·7	11·80	·65	·08	1·05	1·29	57
Prospect and Sherwood.....	5,010	0·7	7·78	·60	·29	·60	·60	51
Smithfield and Fairfield	3,060	0·2	9·80	·65	·65	·98	·98	70

METEOROLOGY.

The following table, compiled from information supplied by the Sydney Meteorological Bureau, shows that the mean temperature of the air in Sydney during 1916 was 63·4 degrees Fahrenheit, which is 0·4 degrees higher than the mean of fifty-seven years' observation. An examination of the monthly means shows that the mean temperatures were above the average, except in the months of March, April, October, November, and December. January, February, and December were the warmest months of the year, whilst July was the coldest.

The rainfall for the year was 3·161 inches below the average of fifty-seven years. The months of April, September, October, and December showed a rainfall above the average, October exhibiting by far the heaviest rainfall of the year.

TABLE 2.

TABLE 2.
Temperature and Rainfall, 1916.

	Temperature in Shade.			Departure of Mean Monthly Temperature from Average of 57 Years. (+ or -)	Rainfall.		
	Max. Extreme.	Min. Extreme.	Mean for Month.		Number of Rainy Days.	Amount, Inches.	Departure of Amount from Average of 57 Years. (+ or -) In Inches.
	deg. F.	deg. F.	deg. F.	deg. F.			
January	97·0	61·0	73·6	+2·0	7	1·470	-2·069
February	90·7	59·3	72·3	+1·1	17	2·673	-1·889
March	88·5	54·9	68·7	-0·6	12	2·460	-2·817
April	81·2	47·9	64·5	-0·1	10	6·155	+0·810
May	76·1	44·5	59·5	+1·0	11	2·251	-2·806
June.....	69·1	41·4	55·9	+1·5	14	2·192	-2·980
July.....	66·5	43·0	53·8	+1·4	18	3·257	-1·665
August.....	72·1	42·3	55·6	+0·6	13	2·758	-0·394
September	83·1	46·3	60·3	+1·3	9	4·510	+1·672
October	80·4	50·0	62·3	-1·3	17	11·135	+8·327
November	87·9	49·3	64·5	-2·6	15	2·625	-0·192
December	86·0	57·6	69·7	-0·4	18	3·420	+0·781
Means and totals for the year 1916.	97·0 in January.	41·4 in June.	63·4	+0·4	161	44·906	-3·161

SCARLET FEVER.

TABLE 3.

TABLE showing cases of Scarlet Fever notified, together with the attack-rates from Scarlet Fever per 1,000 of the estimated mean population for the year 1916 :—

District.	Estimated Mean Population.	Cases of Scarlet Fever notified.	Attack-rates of Scarlet Fever per 1,000 living.	Death-rates of Scarlet Fever per 1,000 living.
City of Sydney	105,100	254	2·42	·03
Alexandria	11,500	23	2·00	·09
Annandale.....	12,500	38	3·04	.....
Ashfield.....	27,650	111	4·01	·04
Balmain.....	33,540	100	2·98	·03
Bexley	10,540	117	11·10	·09
Botany.....	5,690	12	2·11	.....
Burwood.....	12,560	31	2·47	·16
Canterbury.....	24,930	86	3·45	·12
Concord	6,410	23	3·59	·16
Darlington	3,880	17	4·38	.....
Drummoyne	13,550	38	2·80	.....
Eastwood	1,410	4	2·84	.....
Enfield	5,630	15	2·66	.....
Erskineville	7,740	29	3·75	·13
Glebe	22,900	97	4·24	·13
Homebush.....	1,030	3	2·91	.....
Hunter's Hill	4,483	11	2·45	·22
Hurstville.....	10,470	39	3·72	·10
Kogarah	12,460	72	5·78	·08
Lane Cove	4,910	7	1·43	.....
Leichhardt	26,928	105	3·90	·04
Manly	13,940	37	2·65	.....
Marrickville.....	37,470	187	4·99	·11
Mascot	8,600	28	3·26	·12
Mosman	17,030	47	2·76	.....
Newtown	28,030	115	4·10	·18
North Sydney	41,090	78	1·90	.....
Paddington	26,110	37	1·42	.....
Petersham	24,010	91	3·79	·08
Randwick.....	32,560	101	3·10	·03
Redfern.....	25,240	83	3·29	.....
Rockdale	19,890	122	6·13	·15
Ryde	9,200	46	5·00	.....
St. Peter's	10,680	33	3·09	·09
Strathfield	5,560	24	4·32	.....
Vaucluse	2,470	7	2·83	.....
Waterloo	11,270	33	2·93	.....
Waverley	27,400	66	2·41	.....
Willoughby	20,720	39	1·88	.....
Woollahra.....	20,270	32	1·58	.....
Ku-ring-gai Shire	14,200	30	2·11	.....
Whole Metropolis.....	761,551	2,468	3·24	·05
Auburn	10,790	43	3·99	.....
Bankstown	5,320	10	1·88	.....
Camden and Canley Vale.....	1,600	3	1·87	.....
Dundas	1,630	9	5·52	.....
Ermington and Rydalmere	1,730	1	·58	.....
Granville	11,070	33	2·98	.....
Liverpool	7,940	8	1·01	.....
Lidcombe	3,940	46	11·68	.....
Parramatta	12,370	32	2·59	.....
Prospect and Sherwood	5,010	19	3·79	.....
Smithfield and Fairfield.....	3,060	7	2·29	.....

TABLE 4.

NOTIFIED Scarlet Fever in the Metropolis since notification became legal, showing incidence and mortality.

Year.	Cases.	Attack-rate per 1,000 of Population.	Deaths.	Case-fatality per cent.	Death-rate per 1,000 of Population.
1898.....	2,425	5.37	25	1.03	0.07
1899.....	556	1.20	10	1.80	0.02
1900.....	464	0.98	5	1.07	0.01
1901.....	884	1.82	13	1.41	0.02
1902.....	1,253	2.54	38	3.03	0.07
1903.....	2,910	5.77	48	1.65	0.09
1904.....	1,361	2.40	14	1.03	0.02
1905.....	1,136	2.15	16	1.41	0.03
1906.....	1,869	3.44	22	1.17	0.04
1907.....	976	1.72	11	1.12	0.02
1908.....	1,153	2.00	20	1.73	0.03
1909.....	836	1.41	8	0.9	0.01
1910.....	394	0.65	9	2.28	0.01
1911.....	369	0.57	3	0.81	0.004
1912.....	204	0.45	6	1.9	0.008
1913.....	305	0.79	12	2.16	0.002
1914.....	1,717	2.32	16	0.9	0.02
1915.....	4,190	5.53	48	1.14	0.07
1916.....	2,468	3.24	38	1.53	0.05

Scarlet fever was not so prevalent in the metropolitan area as during the previous years, viz., 2,468 cases notified as compared with 4,190 in 1915.

The attack-rate was 3.24 per 1,000 of the population, and the fatality rate 1.53 per cent., which is somewhat higher than that of the previous year (1.14).

Scarlet fever was most prevalent in the months of May and August, and least so during the months of June and December. With regard to local incidence the largest numbers of cases were reported from the City of Sydney, Marrickville, Rockdale, and Bexley. The municipalities of Homebush and Eastwood were the least affected.

DIPHTHERIA.

TABLE 5.

TABLE showing cases of Diphtheria notified, together with the attack-rates and death-rates from Diphtheria per 1,000 of the estimated mean population, for the year 1916.

District.	Estimated Mean Population.	Cases of Diphtheria notified.	Attack-rates of Diphtheria per 1,000 living.	Death-rates of Diphtheria per 1,000 living.
City of Sydney	105,100	484	4.61	.14
Alexandria	11,500	35	3.04	.26
Annandale.....	12,500	56	4.48	.40
Ashfield.....	27,650	48	1.74	.....
Balmain.....	23,540	89	3.78	.42
Bexley	10,540	42	3.98	.09
Botany.....	5,690	50	3.52	.....
Burwood.....	12,560	13	1.04	.....
Canterbury.....	24,930	186	7.46	.12
Concord	6,410	13	2.03	.....
Darlington	3,880	12	3.09	.26
Drummoyne	13,550	27	1.99	.15
Eastwood	1,410	1	.71	.....
Enfield	5,630	6	1.07	.18
Ersleville	7,740	34	4.39	.39
Glebe	22,500	113	4.43	.....
Homebush.....	1,030	1	.97	.....
Hunter's Hill	4,483	12	2.68	.45
Hurstville.....	10,470	26	2.48	.10
Kogarah	12,460	39	2.13	.32
Lane Cove	4,910	10	2.04	.....
Leichhardt	26,528	89	3.31	.22
Manly	13,940	31	2.22	.29
Marrickville.....	37,470	190	5.07	.16
Mascot	8,000	35	4.07	.23
Mosman	17,030	24	1.41	.12
Newtown	28,030	124	4.42	.11
North Sydney	41,090	84	2.04	.17
Paddington	26,110	118	4.52	.15

DIPHTHERIA—*continued*.TABLE 5—*continued*.

District.	Estimated Mean Population.	Cases of Diphtheria notified.	Attack-rates of Diphtheria per 1,000 living.	Death rates of Diphtheria per 1,000 living.
Petersham	24,010	61	2.54	.03
Randwick.....	32,560	122	3.75	.15
Redfern.....	25,240	77	3.05	.24
Rockdale	19,890	44	2.21	.10
Ryde	9,200	41	4.46	.....
St. Peters	10,680	64	5.99	.09
Strathfield	5,560	5	.90	.36
Vauchuse	2,470	4	1.62	.....
Waterloo	11,270	31	2.75	.09
Waverley	27,400	66	2.41	.11
Willoughby	20,720	42	2.03	.05
Woollahra.....	20,270	42	2.07	.05
Ku-ring-gai Shire	14,200	24	1.69	.14
Whole Metropolis.....	761,551	2,585	3.39	.15
Auburn	10,790	21	1.95	.....
Bankstown	5,320	19	3.57	.....
Cabramatta and Canley Vale.....	1,600	6	3.75	.....
Dundas	1,630	6	3.68	.....
Ermington and Rydalmere	1,730	3	1.73	.....
Granville	11,070	28	2.53	.....
Liverpool	7,940	24	3.02	.13
Lidcombe	3,940	40	10.15	.25
Parramatta	12,370	39	3.15	.08
Prospect and Sherwood	5,010	9	1.80	.....
Smithfield and Fairfield.....	3,060	3	.98	.33

TABLE 6.

NOTIFIED Diphtheria in the Metropolis since notification became legal, showing incidence and mortality in each year.

Year.	Cases.	Attack-rate per 1,000 of Population.	Deaths.	Case-fatality per cent.	Death-rate per 1,000 of Population.
1898	613	1.43	75	12.23	.16
1899	285	.66	14	4.91	.03
1900	278	.63	21	7.55	.05
1901	439	.95	65	14.82	.13
1902	393	.79	37	9.41	.07
1903	690	1.37	73	10.60	.14
1904	738	1.40	45	6.10	.08
1905	695	1.19	42	6.00	.07
1906	659	1.21	32	4.85	.05
1907	659	1.16	46	6.98	.08
1908	880	1.53	38	4.20	.06
1909	1,144	1.93	43	3.70	.07
1910	2 109	3.47	61	2.89	.10
1911	1,834	2.86	58	3.16	.09
1912	2,632	3.92	105	3.9	.15
1913	2,041	2.89	96	4.70	.13
1914	2,011	2.67	95	4.72	.11
1915	2 295	3.03	95	4.13	.14
19.6	2 585	3.39	111	4.29	.15

Diphtheria was slightly more prevalent in 1916 than during the previous year, the attack-rate being 3.39 per 1,000 of the population. The monthly numbers of cases notified were highest in March, April, and May and lowest in October, November, and December.

The highest attack-rates were in the municipalities of Canterbury (7.46 per 1,000) and St. Peters (5.99 per 1,000).

Among the extra metropolitan districts, the highest rate was experienced in the municipality of Lidcombe (10.15 per 1,000).

Mortality.—Out of 2,585 persons attacked, 111 died, giving a case-fatality per cent. of 4.29 compared with 4.13 in 1915. The death-rate per 1,000 of the population was .15.

TYPHOID FEVER.

TABLE 7.

TABLE showing cases of Typhoid Fever notified, together with the attack-rates and death-rates from Typhoid Fever per 1,000 of the estimated mean population for the year 1916 :—

District.	Estimated mean population.	Cases of typhoid fever notified.	Attack-rate of typhoid fever per 1,000 living.	Death-rate of typhoid fever per 1,000 living.
City of Sydney	105,100	64	·61	·11
Alexandria	11,500	83	7·22	·78
Annandale.....	12,500	5	·40	·08
Ashfield.....	27,650	10	·36	·07
Balmain.....	23,540	11	·47	·13
Bexley	10,540	2	·19	.....
Botany.....	5,690	52	9·14	·70
Burwood.....	12,560	1	·08	.....
Canterbury.....	24,930	4	·16	.....
Concord	6,410	2	·31	.....
Darlington	3,880	9	2·32	·52
Drammoyne	13,550	12	·89	·07
Eastwood	1,410	1	·71	.....
Enfield	5,630	3	·53	·36
Erskineville	7,740	2	·26	·13
Glebe	22,900	20	·87	·04
Homebush.....	1,030	.....	.....	.....
Hunter's Hill	4,483	8	1·78	·22
Hurstville.....	10,470	3	·29	·10
Kogarah	12,460	3	·24	.....
Lane Cove	4,910	3	·61	·20
Leichhardt	26,928	10	·37	·07
Manly.....	13,940	9	·65	.....
Marriekville.....	37,470	28	·75	·03
Mascot	8,600	36	4·19	·23
Mosman	17,030	7	·41	·06
Newtown	28,030	18	·64	·04
North Sydney	41,090	15	·37	·02
Paddington	26,110	11	·42	·08
Petersham	24,010	13	·54	.....
Randwick.....	32,560	23	·71	·03
Redfern.....	25,240	35	1·39	·08
Rockdale	19,890	14	·70	·10
Ryde	9,200	8	·87	.....
St. Peters	10,680	6	·56	.....
Strathfield	5,560	4	·72	.....
Vaughan	2,470	1	·41	.....
Waterloo	11,270	40	3·55	·44
Waverley	27,400	22	·80	·07
Willoughby	20,720	3	·14	·10
Woollahra	20,270	3	·15	.....
Ku-ring-gai Shire	14,200	9	·63	.....
Whole Metropolis.....	761,551	613	·80	·09
Auburn	10,790	2	·19	.....
Bankstown	5,320	2	·38	.....
Cabramatta and Canley Vale.....	1,600	.....	.....	.....
Dundas	1,630	1	·61	.....
Ermington and Rydalmere	1,730	1	·58	.....
Granville	11,070	6	·54	·09
Liverpool	7,940	10	1·20	.....
Lidcombe	3,940	3	·76	.....
Parramatta	12,370	3	·24	.....
Prospect and Sherwood	5,010	.....	.....	.....
Smithfield and Fairfield.....	3,060	.....	.....	.....

TABLE 8.

NOTIFIED Typhoid Fever in the Metropolis since notification became legal, showing incidence and mortality in each year.

Year.	Cases.	Attack-rate per 1,000 of Population.	Deaths.	Case-fatality per 100 Notified Cases.	Death-rate per 1,000 of Population.
1898	824	1.93	73	8.86	.17
1899	786	1.81	87	11.08	.20
1900	983	2.25	103	10.47	.23
1901	829	1.71	81	9.77	.17
1902	610	1.23	59	9.70	.12
1903	833	1.66	81	9.72	.16
1904	665	1.29	64	9.62	.12
1905	561	1.06	58	10.34	.11
1906	485	.89	60	12.37	.11
1907	505	.89	51	10.09	.09
1908	678	1.17	75	11.06	.13
1909	700	1.18	81	11.50	.14
1910	812	1.33	84	10.34	.13
1911	488	.76	50	10.24	.08
1912	535	.80	53	9.9	.07
1913	566	.81	59	10.42	.09
1914	616	.81	82	13.31	.11
1915	746	.98	74	9.91	.11
1916	613	.80	65	10.6	.09

Incidence.—613 cases of typhoid fever were notified during the year. The attack-rate (.80) was lower than that of the previous year (.98 per 1,000).

The monthly numbers of cases notified were highest in the months of February and March and lowest in June. No cases were reported from the municipality of Homebush. Among the different metropolitan municipalities the highest attack-rates were experienced in Botany (9.14 per 1,000), Alexandria (7.22), Mascot (4.19), and Waterloo (3.55). In the extra metropolitan districts the highest attack-rate occurred in the municipality of Liverpool.

Mortality.—The deaths from typhoid fever totalled 65, giving a death-rate of .09 per 1,000 of the population, which is gratifying, being lower than that of the two preceding years. The case-fatality per cent., 10.6, was, however, slightly higher than that of the previous year (9.91).

The largest number of cases reported for any municipality during the year was eighty-three from Alexandria.

This outbreak was, in my opinion, due to grossly insanitary conditions in certain streets of the municipality, caused chiefly by the utter lack of sanitary sense on the part of inhabitants. Energetic action was taken by the local sanitary inspector with most beneficial results.

Fifty-two cases were notified from the municipality of Botany, and, in my opinion, many of these were due to infection from the dairy conducted by Mrs. D—, owing to the presence of another carrier on the premises. (This dairy was the cause of an outbreak in the previous year.) It is interesting to note that as the result of the vacation of this dairy by certain members of the family the cases decreased in numbers. However, the family concerned moved to the municipality of Ryde on ceasing to reside at Botany, with the result that a small outbreak occurred in Ryde. On investigation, this second carrier was detected and removed from the district with dramatic results in the decline of the number of cases. This carrier is being kept under observation, and strict precautionary measures have been taken with respect to such person.

TUBERCULOSIS.

The number of deaths from all forms of tuberculosis in the Metropolis proper during 1916 was 558, of which 489 were due to tuberculosis of the lungs, 29 to tubercular meningitis, and 40 to other tubercular diseases. The total does not include 65 deaths from phthisis which occurred in the Benevolent Asylums, all former Metropolitan residents. When these figures are included the total deaths from phthisis for the year were 623.

The appended table represents as accurately as possible the true number of deaths from phthisis which ought to be debited to the Metropolis proper for each of the past thirteen years.

1903	589	1910	495
1904	550	1911	541
1905	495	1912	494
1906	498	1913	621
1907	512	1914	601
1908	504	1915	658
1909	458	1916	623

Under the provisions of the Public Health (Amendment) Act, 1915, whereby pulmonary tuberculosis is notifiable within the metropolitan combined sanitary districts, 1,259 notifications were received during the year, of which 623 were indicated as to be visited and 636 not to be visited by the medical practitioners reporting the cases.

Under

Under the City Council's by-laws, 262 notifications were received from within the City of Sydney itself.

The Act has been administered with but little friction, but it is anticipated that the City Council's by-laws may be repealed at a future date so as to avoid confusion and dual notification within the city proper.

INFANTILE PARALYSIS.

This disease occurred in epidemic form in New South Wales during the early part of the year, resulting in the notification of 186 cases within the Metropolitan area for the year 1916, which is by far the largest number reported since the disease was declared a notifiable one, viz:—

1912	28 cases notified
1913	32 " "
1914	63 " "
1915	48 " "
1916	186 " "

The epidemic actually began in December, 1915, and persisted through 1916 during the months of January, February (maximum), March, and April. A rapid decline occurred in the months of May and June, subsequent to which months the epidemic practically ceased.

The following table indicates the distribution of cases:—

City of Sydney	13	Marrickville	10
Alexandria	3	Mascot	3
Annandale	1	Mosman	2
Ashfield	16	Newtown	7
Balmain	12	North Sydney	4
Bexley	5	Paddington	9
Botany	1	Petersham	7
Burwood	3	Randwick	13
Canterbury	8	Redfern	9
Conecord	1	Rockdale	3
Drummoyne	2	Ryde	2
Enfield	2	St. Peters	3
Glebe	3	Strathfield	1
Homebush	2	Waterloo	5
Hurstville	5	Waverley	1
Kogarah	2	Willoughby	6
Lane Cove	2	Woollahra	5
Leichhardt	4	Shire of Kuring-gai	4
Manly	7		

No cases were reported from the municipalities of Darlington, Eastwood, Erskineville, Hunter's Hill, and Vacluse. Of the extra Metropolitan districts, 1 case was reported from each of the following—Granville, Liverpool, Parramatta, and Warringah shire; and 2 cases respectively from Auburn, Lidcombe, Smithfield and Fairfield, and Hornsby shire. Thus it will be seen the disease was widely spread throughout the Metropolis. The epidemic affected, for the most part, as is usual, the very young children.

The deaths from infantile paralysis within the Metropolitan area totalled 17 during the year.

The press gave prominence to the epidemic, and numerous theories as to the causation of the disease were put forward, one of which sought to implicate more particularly the marine suburbs and the practice of sea-bathing. As the result of a special investigation made in connection with each case reported in the Metropolitan area, the above theory could not be substantiated.

No particular prevalence of any insect was noted, with, perhaps, the exception of fleas.

Features of interest in connection with the epidemic were the facts that the rainfall during the months of January, February, and March was below the average, and that the mean temperature in the shade was above the average during the months of January and February. It will thus be seen that the epidemic was at its height during a warm, dry and dusty season.

MALARIA.

During the year 40 cases of malaria were notified within the Metropolitan area, and 15 from the extra Metropolitan districts.

The following table shows the distribution of cases:—

City of Sydney	24	Randwick	1
Ashfield	1	Willoughby	1
Leichhardt	1	Woollahra	1
Marrickville	4	Liverpool	11
North Sydney	2	Lidcombe	4
Paddington	5		

As a means for the prevention of this disease and others such as dengue fever, more particularly in the northern parts of the State, an ordinance was gazetted under the Local Government Act, 1906, in October, 1916, providing for the prevention of the breeding of mosquitoes. This ordinance is optional, but may, at the request of the council of any municipality, be applied by the Governor to any such district.

EPIDEMIC

EPIDEMIC CEREBRO-SPINAL FEVER.

This disease became notifiable in October, 1915, and the gazettal of such was due to an outbreak which originated at the Liverpool Military Camp in that year.

During the current year 117 notifications were received within the Metropolitan area, resulting in 62 deaths. The largest number of cases were reported during the months of August and September.

The distribution of these cases was as follows:—

City of Sydney 18	Manly 2
Alexandria 1	Marrickville 11
Annandale 2	Mascot 1
Ashfield 3	Newtown 6
Balmain 2	North Sydney 5
Bexley 6	Paddington 7
Botany 1	Petersham 3
Canterbury 6	Randwick 5
Darlington 1	Redfern 7
Drummoyne 3	Rockdale 4
Erskineville 1	St. Peters 1
Glebe 2	Waterloo 2
Hunter's Hill 2	Waverley 3
Hurstville 4	Willoughby 1
Kogarah 3	Woollahra 1
Leichhardt 3	

Fourteen cases were notified from the extra Metropolitan districts, viz.:—

Auburn 2	Liverpool 8
Bankstown 1	Hornsby Shire 1
Cabramatta & Canley Vale 1	Warringah Shire 1

INFANTILE MORTALITY.

The deaths of children under 1 year of age in the Metropolitan districts during 1916 numbered 1,389, whilst the births totalled 20,856, giving an infantile mortality rate of 67 per 1,000 births. This rate is extremely gratifying, being the lowest on record, and is 7 per cent. below the average of the previous five years, all years of very low infantile mortality.

Year.	Deaths of Children under 1 year per 1,000 births.	Year.	Deaths of Children under 1 year per 1,000 births.
1880...	192	1899...	120
1881...	162	1900...	109
1882...	183	1901...	120
1883...	163	1902...	119
1884...	172	1903...	116
1885...	187	1904...	99
1886...	173	1905...	88
1887...	141	1906...	85
1888...	152	1907...	97
1889...	172	1908...	83
1890...	135	1909...	81
1891...	148	1910...	82
1892...	130	1911...	71
1893...	147	1912...	76
1894...	134	1913...	77
1895...	131	1914...	68
1896...	139	1915...	72
1897...	129	1916...	67
1898...	153		

TABLE 9.

INFANT mortality in the Metropolis during 1916 from stated causes:—

Measles 5	Diseases of the Stomach ... 8
Whooping Cough 60	Diarrhoea and Enteritis ... 314
Diphtheria 19	Intestinal Obstruction and Hernia... .. 6
Influenza 1	Other Diseases of Digestive System... .. 1
Tubercular Meningitis ... 5	Bright's Disease 1
Other Tubercular Diseases 1	Prematurity 368
Cerebro-spinal Fever ... 12	Developmental Diseases ... 314
Meningitis 11	Accident 12
Convulsions... .. 28	All Other Causes 54
Other Diseases of Nervous System... .. 5	
Bronchitis 33	
Pneumonia 127	
Other Respiratory Diseases 4	
	Total 1,389

Under

Under the general heading "Developmental Diseases" are included injury at birth, debility at birth, atelectasis, congenital defects, atrophy, marasmus, and dentition.

Comparison may be made between the number of deaths under 1 year of age from certain of the causes in the last table with those from the same causes during the five antecedent years :—

TABLE 10.

Causes of Death.	1911.	1912.	1913.	1914.	1915.	1916.
Measles.....	2	32	2	1	29	5
Whooping-cough.....	42	30	83	34	14	60
Diphtheria.....	6	8	7	10	16	19
Diarrhœal Diseases.....	350	523	474	457	422	314
Tubercular Meningitis.....	6	9	13	9	7	5
Other Tubercular Diseases.....	2	1	5	7	6	1
Prematurity.....	298	310	398	360	417	368
Developmental Diseases.....	250	292	294	370	302	314
Convulsions.....	30	26	30	48	33	28
Meningitis.....	24	16	23	17	13	11
Bronchitis.....	42	37	39	23	19	33
Pneumonia.....	79	65	83	101	125	127
Diseases of the Stomach.....	19	17	14	8	3	8
Intestinal Obstruction.....	12	7	13	12	13	6
All other causes.....	105	118	114	82	63	90
Totals.....	1,267	1,491	1,592	1,539	1,585	1,389

This table shows that the number of deaths from whooping-cough was the highest since 1913.

It is gratifying to note the decrease in the number of deaths from diarrhœal diseases and prematurity.

If reference is made to Table I, a comparison may be made of the infantile mortality rate in the various municipalities of the Metropolis. It appears from that table that the most unfavourable rates were experienced in Darlington, Alexandria, St. Peters, and Erskineville. It should, however, be remembered that the comparison of these rates is not altogether fair, since births are not distributed to the various districts in a similar manner to the deaths.

NOTES ON SANITARY WORK OF THE YEAR.

One hundred and fifteen dwellings (apart from the city proper) were inspected, and ascertained to be in an insanitary condition. They were distributed as follows:—

Ashfield	14	Newtown	1
Balmain	3	Paddington	7
Canterbury	4	Petersham	6
Darlington	1	Randwick	5
Drummoyne	1	Redfern	1
Erskineville	6	St. Peters	7
Enfield	1	Strathfield	1
Kogarah	3	Vaughan	1
Lane Cove	2	Waterloo	2
Leichhardt	3	Waverley	7
Marrickville	2	Willoughby	1
Mascot	2	Woollahra	1
Mosman	5	Kuring-gai Shire.. .. .	1

Extra-Metropolitan.

Bankstown	4	Lidcombe	1
Dundas	3	Parramatta	5
Granville	6	Prospect and Sherwood	2
Liverpool	6		

SPECIAL INSPECTION OF HOTELS—PUBLIC HEALTH (AMENDMENT) ACT, 1915.

A special inspection (as a part of general action of the Department of Public Health) was made from this office of 63 licensed hotels situated within the districts of Glebe, Petersham, Leichhardt, Annandale, Ashfield, Marrickville, Rockdale, Kogarah, Hurstville, Bexley, and Sutherland Shire.

This inspection was made at the request of the Police Department, with a view of assisting licensing inspectors in obtaining evidence as to the sanitary conditions of hotels when the licensees made application to the Court for a renewal of their license.

Reports were submitted to the Court in each case.

Nuisances arising from drainage were investigated in Alexandria, Annandale, Balmain, Burwood, Canterbury, Drummoyne, Erskineville, Leichhardt, Marrickville, Mosman, Randwick, Redfern, Rockdale, Ryde, Vaughan, Waverley, Willoughby, Woollahra, Kuring-gai, Bankstown, Cabramatta, Dundas, Granville, Prospect, and Sherwood.

Nuisances from stables were investigated at Alexandria, Erskineville, Glebe, Kogarah, Leichhardt, Paddington, Randwick, Strathfield, and Willoughby.

Septic Tanks.—Sites were inspected and plans examined in connection with 58 applications for septic tank installations in the following districts:—Alexandria (1), Balmain (1), Concord (1), Hunter's Hill (15), Randwick (1), Rockdale (6), Ryde (2), Vacluse (6), Woollahra (14), Kuring-gai (15), Bankstown (1). Nuisances arising from septic tanks were investigated at Hunter's Hill (1), North Sydney (3), Ryde (1), and Kuring-gai (4).

Miscellaneous nuisances were investigated at Ashfield, Bexley, Botany, Burwood, Manly, Newtown, Waverley, and Willoughby.

Garbage depôts were inspected at Alexandria, Bexley, Canterbury, Enfield, Kogarah, Mosman, Paddington, Waterloo, Woollahra, Parramatta.

Garbage destructors were inspected at Marrickville and Woollahra. During the year Marrickville and Woollahra erected installations for the treatment of garbage by fire and crushing respectively.

TABLE 11.

SHOWING Legal Proceedings taken by Local Authorities in respect of matters affecting the Public Health during the year 1916.

Municipality.	Public Health.	Noxious Trades.	Police Offences.	Cattle Slaughtering, Diseased Animals, and Meat.	Local Government Ordinances.	Convictions.	Dismissals.	Withdrawn.	Totals.
Alexandria	1	...	...	1	2	...	...	2
Annandale.....	1	1	...	...	1
Ashfield.....	9	...	...	...	3	11	...	1	12
Balmain.....	...	2	...	...	8	7	...	1	8
Bexley.....	1	1	...	...	1
Botany.....	2	1	...	1	2
Burwood.....	Nil.
Canterbury.....	2	1	...	1	2
Concord.....	17	...	...	17	...	...	17
Darlington.....	Nil.
Drummoyne.....	46	43	2	1	46
Eastwood.....	1	1	...	...	1
Enfield.....	Nil.
Erskineville.....	Nil.
Glebe.....	10	10	...	...	10
Homebush.....	Nil.
Hunter's Hill.....	3	3	...	...	3
Hurstville.....	Nil.
Kogarah.....	28	22	...	6	28
Lane Cove.....	1	1	...	...	1
Leichhardt.....	6	5	...	1	6
Manly.....	Nil.
Marrickville.....	Nil.
Mascot.....	1	...	...	...	3	4	...	...	4
Mosman.....	1	1	...	...	1
Newtown.....	Nil.
North Sydney.....	29	...	...	...	10	28	...	11	39
Paddington.....	2	1	...	1	2
Petersham.....	Nil.
Randwick.....	1	...	...	...	2	3	...	...	3
Rockfern.....	Nil.
Rockdale.....	Nil.
Ryde.....	Nil.
St. Peters.....	Nil.
Strathfield.....	1	...	...	...	1	2	...	...	2
Vacluse.....	Nil.
Waterloo.....	4	3	...	1	4
Waverley.....	9	...	...	...	...	5	...	4	9
Willoughby.....	52	52	...	...	52
Woollahra.....	1	...	...	...	...	...	...	1	1
Auburn.....	Nil.
Bankstown.....	2	...	...	...	49	51	...	...	51
Dundas.....	Nil.
Ermington.....	Nil.
Granville.....	...	11	...	...	72	83	...	...	83
Lidcombe.....	Nil.
Liverpool.....	Nil.
Parramatta.....	1	...	...	...	2	3	...	...	3
Prospect.....	Nil.
Smithfield.....	Nil.
SHIRES.									
Hornsby.....	Nil.
Kuring-gai.....	Nil.
Warringah.....	1	1	...	...	1

TABLE 12.

SANITARY OFFICERS.

The following list shows the names and qualifications of the Sanitary Officers of the several municipalities in the Metropolitan Combined Districts:—

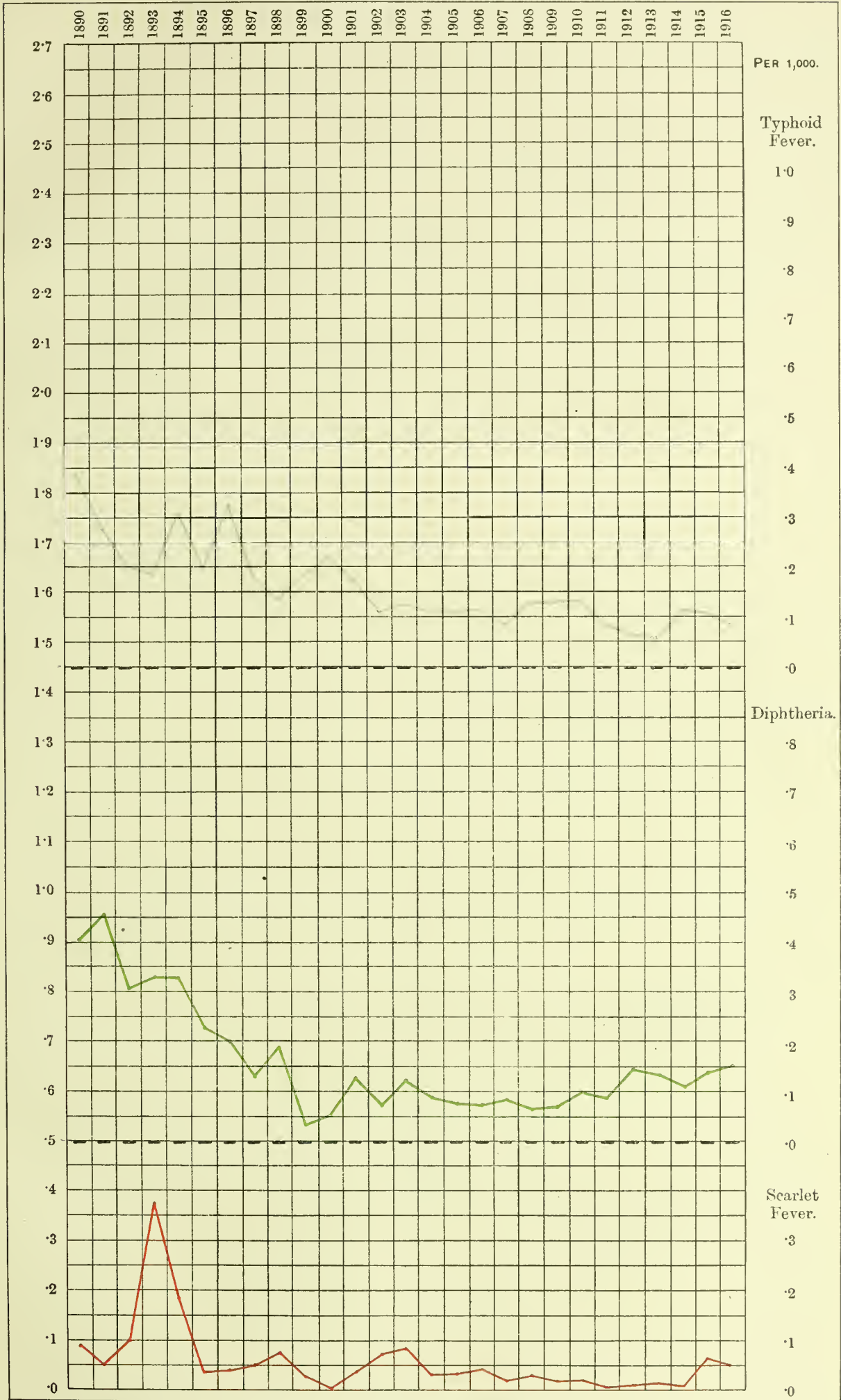
Municipality.	Estimated mean Population, 1915.	Sanitary Inspectors.
City of Sydney	105,100	Chief Inspector, B. Lloyd, Cert. R.S.I.; J. D. Smith, Cert. R.S.I.; W. E. Gundry, Cert. R.S.I.; W. D. McNeil, Cert. R.S.I.; J. W. Martin, Cert. R.S.I.; F. Letchford, Cert. R.S.I.; F. A. Cuddy, Cert. R.S.I.; O. Vincent, Cert. R.S.I.; E. A. Dowling, Cert. R.S.I.; A. H. Judd, Cert. R.S.I.; E. S. Furness, Cert. R.S.I.; A. Cook, Cert. R.S.I.; A. S. Webb, Cert. R.S.I.; W. O. Vogwell, Cert. R.S.I.; Miss Ish Bloomfield, Cert. R.S.I.; A. B. Norton, Cert. R.S.I.; George Cornwell, James Brady, Meat Inspectors' Certificate, Sydney Technical College.
Alexandria.....	11,500	H. S. Doig, Cert. R.S.I.
Annandale	12,500	A. S. Campbell.
Ashfield	27,650	Charles Van Treight, Cert. R.S.I.
Balmain	33,540	F. J. Paris, Cert. R.S.I.; and A. Sinfield, Cert. R.S.I.
Bexley	10,540	W. J. Devene, Cert. R.S.I. and J. Ellis, R.S.I.
Botany	5,690	J. Ellis, Cert. R.S.I.; and G. O. Holloway.
Burwood	12,560	J. J. Wright, Cert. R.S.I.
Canterbury	24,930	H. J. Ferrett, R.S.I.
Concord	6,410	F. Hildred, Cert. R.S.I.
Darlington	3,880	A. P. Gibson combines duties of Town Clerk and Inspector.
Drummoyne	13,550	H. V. Stewart, Cert. R.S.I.
Eastwood	1,410	S. G. Small combines duties of Town Clerk and Inspector.
Enfield	5,630	S. B. Cottrell, Cert. R.S.I.; and C. Nepean.
Erskineville	7,740	R. Bell, Cert. R.S.I.
Glebe	22,900	W. P. Young, Cert. R.S.I.; and W. P. Massey.
Homebush	1,030	G. Bressington.
Hunter's Hill	4,483	W. C. Wise, Town Clerk and Inspector; J. J. Petre, Assistant Inspector.
Hurstville	10,470	H. Allsop, Cert. R.S.I.
Kogarah.....	12,460	P. Bailey, Cert. R.S.I.
Lane Cove.....	4,910	G. T. Long, Cert. R.S.I.
Leichhardt.....	26,928	W. A. Jackson, R.S.I.
Manly	13,949	T. E. Chorlton, R.S.I.
Marrickville	37,470	P. H. McNeice, Cert. R.S.I.; and W. Copeland, R.S.I.
Mascot.....	8,600	H. J. Robinson.
Mosman.....	17,030	J. L. Walters, Cert. R.S.I.; and A. Macintosh.
Newtown	28,030	J. Watson, Cert. R.S.I.; and J. Kirkpatrick, R.S.I.
North Sydney	41,090	C. T. Trickett, R. C. Nankervis, Cert. R.S.I.; and D. Tate, Cert. R.S.I.
Paddington.....	26,110	A. D. Carmichael, Cert. R.S.I.; and J. Miller, Cert. R.S.I.
Petersham.....	24,010	J. E. Doswell, Cert. R.S.I.
Randwick	32,560	J. A. Wauchope, Cert. R.S.I.; and P. H. Macky, Cert. R.S.I.
Redfern	25,240	J. Forgie, Cert. R.S.I.
Rockdale.....	19,890	J. V. Tyrell, Cert. R.S.I.
Ryde.....	9,200	J. W. Ainsworth.
St. Peters	10,680	F. Fitzpatrick, Cert. R.S.I.
Strathfield.....	5,560	J. S. Cater, Cert. R.S.I.
Vaucluse.....	2,470	J. A. O'Connor, Cert. R.S.I.
Waterloo	11,270	J. W. Henning, Cert. R.S.I.
Waverley	27,400	J. Fitzpatrick, R.S.I.
Willoughby.....	20,720	J. Naylor.
Woollahra.....	20,270	T. J. Lawson, R.S.I.
Kuring-gai Shire	14,200	J. Ward.

NOTE.—The letters "Cert. R.S.I." after an officer's name indicates the possession of the Certificate of the Royal Sanitary Institute.

Extra Metropolitan Municipalities.

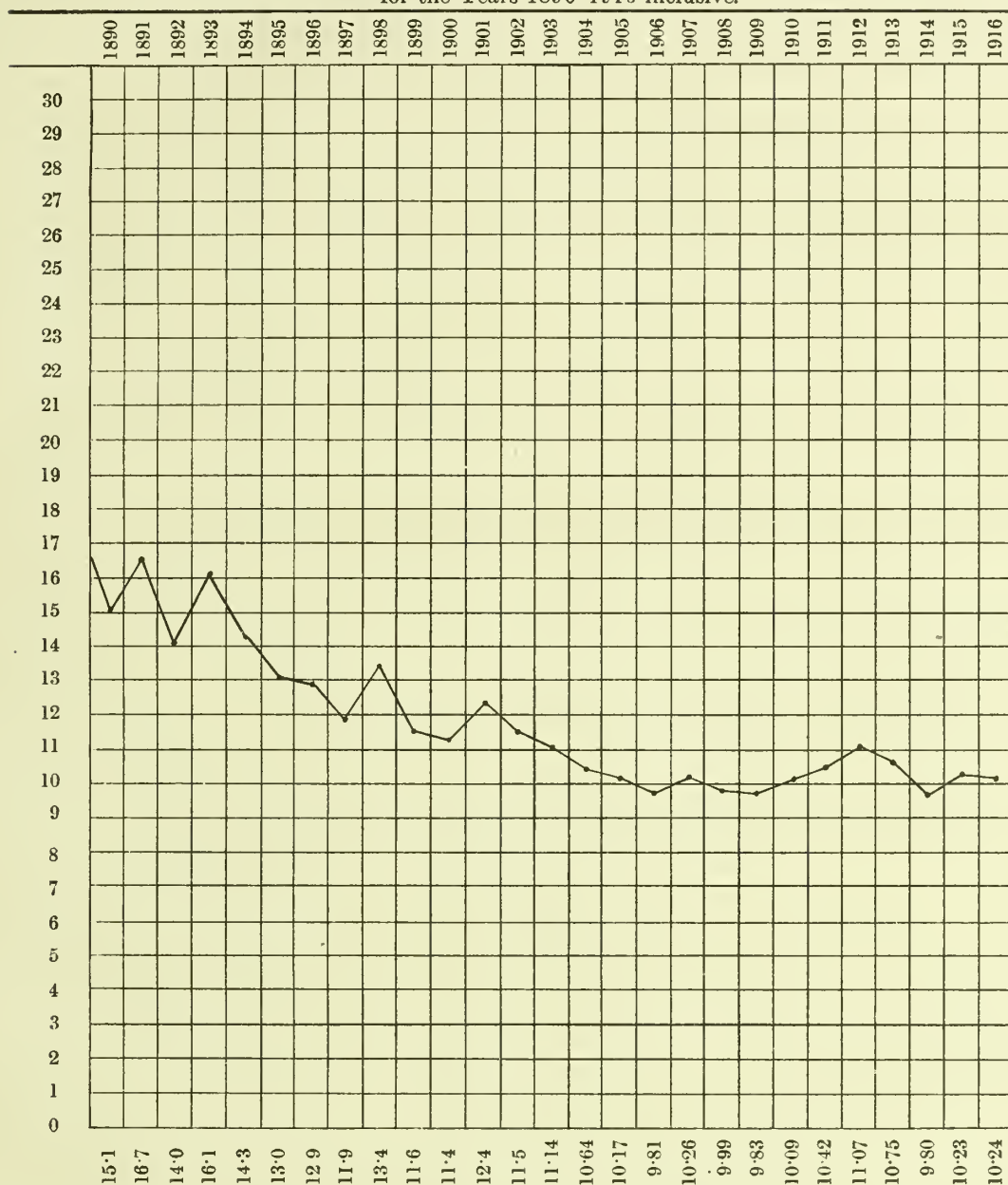
Municipality.	Population.	Sanitary Inspector.
Auburn.....	10,790	A. E. Williams, Cert. R.S.I.
Bankstown.....	5,320	E. E. Thompson.
Cabramatta and Canley Vale ...	1,600	W. H. Johnson, Town Clerk and Inspector.
Dundas.....	1,630	T. Curson, Town Clerk and Inspector.
Ermington and Rydalmere.....	1,730	T. Feather, Town Clerk and Inspector.
Granville	11,070	W. P. Upcroft, Cert. R.S.I.
Lidcombe	3,940	W. R. A. Muirgrove.
Liverpool	7,940	A. McFarlane.
Parramatta.....	12,370	C. W. Bardsley, Cert. R.S.I.
Prospect and Sherwood	5,010	H. R. Stoney, Cert. R.S.I.
Smithfield and Fairfield	3,060	R. H. Dummett, Town Clerk and Inspector.
Hornsby Shire.....	.....	J. Oner, Cert. R.S.I.
Warringah Shire .....	.....	E. Starr, Cert. Sydney Technical College.

DIAGRAM showing the ANNUAL DEATH-RATES in the Metropolis per 1,000 living FROM TYPHOID FEVER, DIPHTHERIA, and SCARLET FEVER for the YEARS 1890-1916 inclusive.



NOTE.—Since 1898 the necessary correction has been made for the deaths of non-residents occurring in Metropolitan Hospitals.

DIAGRAM showing ANNUAL GENERAL DEATH-RATE from all causes per 1,000 living in the Metropolis
for the Years 1890-1916 inclusive.



NOTE.—Since 1898 the necessary correction has been made for the deaths of non-residents occurring in Metropolitan Hospitals.

2.—Hunter River Combined Sanitary District.

Staff.

J. BOOTH-CLARKSON, L.R.C.P. and S. (Edin.), D.P.H. and D.T.M.H. (Camb.),
Acting Medical Officer of Health, Hunter River Combined Sanitary Districts.

Senior Sanitary Inspector GEORGE H. GODFREY.

Nurse-Inspector MARY E. FLETCHER.

Clerk DORIS L. BATE.

REPORT OF THE ACTING MEDICAL OFFICER OF HEALTH FOR THE YEAR 1916.

JAMES BOOTH-CLARKSON, L.R.C.P. and L.R.S.C. (Edin.), D.P.H. (Camb.),
D.T.M.H. (Camb.).

To the Director-General, Public Health Department, N.S.W., Sydney.

Sir,

I have the honour to submit the following report of the Public Health work done in this District during the year 1916.

Description.—The Hunter River Combined District consists of seventeen Municipalities (Plattsburg and Wallsend now being the Municipality of Wallsend) and five Shires and a Police Area for Dairy Inspection purposes.

The population of the whole District at the end of 1916 was estimated at 129,970.

The area is over 3,000 square miles and the distances from Newcastle vary up to 70 miles, but on many occasions the Officials of this Office carry out work outside the H.R.C.D.

General.—As in 1914 and 1915, Dr. Dick still remains in Europe and for the first part of the present year was attached to the Staff of what was then called the Lady Dudley Australian Voluntary Hospital.

Later in the year this hospital was apparently closed and then taken over and continued by the War Office as No. 32 Stationary Hospital.

During the whole of this time this hospital has been, and is at present at Wimmeraux, near Boulogne in France.

I have continued to carry out the duties and the administrative work of this District as Acting Medical Officer of Health, having taken over these duties on May 6th, 1914, previous to which my appointments and experience had been as mentioned in former reports.

It is satisfactory to have to report that the epidemic of smallpox which commenced in this District in July, 1913, and continued, with moderate intermissions, till 5th May, 1916, seems to have been stamped out as there have been no cases since the latter date.

During the epidemic almost all the energy of the staff of this office had to be expended in dealing with the epidemic, but since its subsidence a great deal of the usual work of a public health staff has been accomplished, which I think the following report shows.

ADMINISTRATION.

Staff.—The Staff consists of a Medical Officer of Health, a Senior Sanitary Inspector who is also an Inspector under the Pure Food Act, a Nurse Inspector who, during the present year, has been appointed a Sanitary Inspector and an Inspector under the Pure Food Act. The Slaughtering Inspectors were detached from this Office as mentioned below. There is also a Temporary Clerk who, this year, passed her examination as typist and shorthand writer.

In addition each Municipality and Shire have their own Sanitary Inspectors, but a good many in addition to their Office are also Town Clerks, Clerks of Works, Working Foremen, &c.

Table A. shows the names and qualifications of the abovementioned Sanitary Officers and the additional offices held by some of them.

Slaughtering Inspectors Jurd, Bell, and Abberton were detached from the office staff on the Abattoir being opened in April. Inspectors Jurd and Bell were appointed as Officers of the Abattoir Board while Inspector Abberton returned to the Head Quarters of the Department in Sydney.

The clerical routine of the office is carried on as reported in 1915 in regard to the Card System for registering notifiable diseases and dealing with the notifications received from Local Authorities. Also in regard to special report sheets to show the incidents of disease in the District, and special records of milk supplies to households, attendance at school, and diseases of an infectious nature occurring in connection with dairies.

The expansion of work and of the size of this office necessitates a number of additional books being kept.

TABLE A

TABLE A.

LIST of State and other Sanitary Officers of the Hunter River Combined Sanitary District and their Qualifications.

District.	Population.	Name.	Qualifications.
<i>State.</i>			
Hunter River Combined District.	132,930	Diek, Robert.....	M.B., C.M. (Syd.). D.P.H. (Camb.), M.O.H.
" " .....	.....	Booth-Clarkson, J.	L.R.C.P. and L.R.C.S. (Edin.), D.P.H. and D.T.M.H. (Camb.), Acting M.O.H.
" " .....	.....	Godfrey, George H.	Assoc. Roy. San. Inst. (London).
" " .....	.....	Fletcher, Mary E.	Cert. R.S.I. (Lond.), Trained Nurse.
<i>Municipal.</i>			
Adamstown	2,800	Brown, Wm.	Also Town Clerk.
Carrington.....	2,580	Lawson, J. L.	Also Town Clerk.
Greta	1,100	North, M.	Also Town Clerk.
Hamilton	9,040	Collett, A. C.	Cert. R.S.I. (Lond.).
Lambton	2,700	Noble, H.	Also Town Clerk.
Maitland, East	3,230	Sarginson, W.	
Maitland, West	8,510	Reay, A.	Cert. R.S.I. (Lond.).
Merewether	4,350	Allinson, W.	
Morpeth.....	1,030	McMahon, D.	Also Town Clerk.
Newcastle	13,010	Lloyd, Thos.	Assoc. R.S.I. (Lond.).
New Lambton	1,850	Reynolds —	Also Town Clerk.
Raymond Terrace	900	Adam, A. L.	Also Town Clerk.
Singleton	2,980	Collins, W.	Cert. R.S.I. (Lond.).
Stockton	2,210	Johnson, W.	Cert. R.S.I. (Lond.).
Wallsend	5,790	Cunningham, W.	Assoc. R.S.I. (Lond.).
Waratah.....	5,210	Wrightson, T.	Cert. R.S.I. (Lond.).
Wickham	9,210	Fleming, P.	
<i>Shire.</i>			
Bolwarra	3,230	Wynne, J.	Also Shire Clerk.
Cessnock	25,790	Springbett, W.	Cert. R.S.I. (Lond.).
Lake Macquarie	16,630	Bolton, J. O.	Cert. R.S.I. (Lond.).
Port Stephens	4,060	Davoren, E.	Also Shire Engineer.
Tarro	6,760	Branch, Ed.	

NOTE.—The letters, Assoc. R.S.I. after an Officer's name indicates that he is an Associate of the Royal Sanitary Institute, London. The letters, Cert. R.S.I., indicate the possession of the certificate of the Royal Sanitary Institute which certificate is also required of all Associates.

GENERAL PUBLIC HEALTH WORK CARRIED OUT DURING THE YEAR 1916.

Abattoir.—The Newcastle District Abattoir was opened on 4th June, and now deals with all the cattle killed inside a radius of 14 miles from the General Post Office. Shortly after being opened complaints were made by certain inhabitants of the Waratah District in regard to "odours." I inspected the premises in August, accompanied by Sanitary Inspector Godfrey, at a time when the wind blew in the direction from which the complaints came. No "odours" were to be detected either on the way to or on the premises and everything was found in a very satisfactory condition.

Buildings.—Thirty-five buildings were inspected in different parts of the district, and will be referred to under names of localities.

Garbage Depots.—Six of these were inspected in different municipalities. The majority were found to be in a satisfactory condition, but one required reports to the municipal council. (See item "Lambton.")

Hospitals.—Private hospitals to the number of twenty-five were visited either for inspection or licensing purposes. Some of the public hospitals were also seen on visits in *re* "suspicious cases." All were in a satisfactory condition. All the staffs of the general hospitals are reported vaccinated, and many of the managers and assistants in private hospitals and nursing homes.

Sanitary Depots.—Thirteen sanitary depots were inspected one or more times during the year, and the matter of steam plants and proper trenching received special attention.

Disinfection.—Table B shows the number of cases of diphtheria, scarlet fever, typhoid fever, and variola occurring in the Hunter River Combined Districts to 31st December, 1916, and the number of disinfections reported by Local Authorities for each disease.

It will be seen, that allowing for more than one case on premises, the number of disinfections is by no means equal to the number of cases.

Therefore, the conclusion must be arrived at that a number of premises were not disinfected or were disinfected by the occupiers of the houses. In these cases the regulation states that the medical practitioner shall certify that the premises were satisfactorily disinfected, but it is more than probable that a considerable number were not disinfected at all.

For example—Adamstown notified 17 cases of diphtheria, but no disinfections, and 5 cases of scarlet fever but no disinfections. Lambton reports 11 cases diphtheria and no disinfections, but curiously reports 5 disinfections for 4 cases of scarlet fever and 7 disinfections for 6 cases of typhoid fever. Morpeth reports no disinfections for 2 cases of diphtheria, and no disinfections for 2 cases of typhoid. Wallsend reports 6 disinfections

disinfections for 23 cases of diphtheria, 4 for 7 cases of scarlet fever, and 3 for 2 cases of typhoid. Lake Macquarie reports no disinfections for 7 cases of diphtheria, none for 1 case of scarlet fever, and 1 for 3 cases of typhoid.

The above does not seem satisfactory, and it would seem that disinfection in the case of notifiable diseases might be more satisfactorily carried out.

All the premises where variola occurred were disinfected, and the discrepancy between 27 disinfections and 31 cases of the disease is owing to more than one case having occurred in individual premises.

TABLE B.

Table showing number of cases of diphtheria, scarlet fever, typhoid fever, and variola occurring in Hunter River combined districts to 31st December, 1916, and number of disinfections reported by local authorities for each disease:—

	Diphtheria.		Scarlet Fever.		Typhoid Fever.		Variola.	
	Disinfections.	Cases.	Disinfections.	Cases.	Disinfections.	Cases.	Disinfections.	Cases.
Adamstown.....	7	19	...	5	...	...	...	...
Carrington	9	9	2	2	2	2	...	...
Greta.....	5	5	...	...	1	1	...	...
Hamilton.....	13	14	8	8	1	1	...	...
Lambton .....	...	12	5	4	6	6	...	...
Maitland, East	3	3	17	18	6	6	...	...
Maitland, West.....	16	16	17	21	12	12	...	...
Merewether	13	15	2	3	2	2	...	...
Morpeth .....	...	2	...	...	2	2	...	...
Newcastle	3	12	1	12	5	5	3	5
New Lambton .....	...	2	...	4	1	1	3	3
Raymond Terrace.....	...	1	...	...	...	...	...	...
Singleton	7	7	6	6	1	1	2	2
Stockton.....	...	2	...	6	1	1	...	...
Wallsend	6	26	4	7	7	7	2	4
Waratah	18	20	2	2	2	2	3	3
Wickham.....	25	28	4	5	7	7	10	10
<i>Shires.</i>								
Bolwarra	1	1	...	1	3	3	...	...
Cessnock.....	32	42	31	91	28	28	...	...
Lake Macquarie .....	...	17	2	10	11	13	1	3
Port Stephens.....	...	6	...	1	3	3	1	1
Tarro.....	4	5	4	3	5	5	...	...
Totals.....	152	244	105	207	77	91	25	31

LIST OF PRIVATE HOSPITALS IN HUNTER RIVER COMBINED DISTRICTS.

Town.	Name and address.	Classification.
Abermain	Eames, M., "Cast'eford," Mait'and street	L. 1
Adamstown	Court, D. A., "Royal Mount," Union-street	L. 2
Cessnock.....	Moran and Brennan, "Maseot," Aberdare street.....	M.S.L. 4
Hamilton	Collins, M. A., "Ednaville," Bibby-street	L. 1
Waratah	Johnstone, M., Carrington-street, Mayfield	L. 2
	Whiteman, C. L., Dora-street, Mayfield.....	L. 1
Kurri Kurri	Hestlelow, M., "St. E'mo," Aberdare street	L. 1
Maitland, East	Hodges, C., Morpeth-road	L. 1
Maitland, West	Sawyer, —, 10 Bourke-street.....	L. 1
	Kearney, E., Roxburgh-street, Lorn	L. 2
	Armson, A., Bourke street	L. 2
	Long, G., "Cintra," Regent-street	L. 2
	Tooze, E. E., Sparke street	L. 2
	Livermore, E. E., "Clifton Lodge," Adams-street	M.S.L. 10
	Lynch, Ellen, Church-street	L. 3
Morpeth	King, "Karinga," James-street	L. 2
Newcastle	McCarty, M., 125 Church-street	L. 3
	McDona'd, M. L., "Pipitea Pah," Zara street	M.S.L. 10
Singleton.....	McKnight, E., Castlereagh-street.....	L. 3
	Schmierer, S.	L. 5
	Morr's, M., "Eskar," York-street.....	L. 2
	Badior, S., "Valetta," Church-street	L. 4
	Maffey, Dr., Broughton-street	M.S.L. 10

Military Lectures, &c.—In May I took the two Medical Officers of the 35th and 36th Battalions, then in camp at Broadmeadow, over to the Isolation Hospital and instructed them in variola to the best of my ability, demonstrating the cases then in hospital. Later, Inspector Godfrey gave lectures on General Camp Sanitation to the Australian Army Medical Corps attached to both battalions. Other officers and men were invited to attend. I myself gave some lectures on Practical Sanitation on Active Service, illustrated from my experiences in the Spanish-American and Boer Wars, and Natal Native Rebellion.

Police

Police Courts.—During the year I attended three Police Courts—two in Newcastle and one in Lambton—in order to give evidence in regard to “concealing smallpox.” Two out of three of these cases were fined, and the third would have been had I not thought that the charge which could have been instituted hardly a fair one—and the charge which was made was non-suited. Courts were also attended by an official of this office six times in Pure Food prosecutions.

Office Examinations.—During the year 81 examinations were made of various cases as instructed by the Director-General.

(a) Public Service candidates	47
(b) Pilots... ..	15
(c) Miscellaneous cases	19
Total	81

Trawler “Brolga.”—Owing to some decayed fish sold on this trawler being brought to the office, and other complaints being made, I sent Inspector Lloyd of the Newcastle Council to inspect the methods of handling fish on the trawler. I then paid an independent visit myself and inspected the system. Everything was found to be in a satisfactory condition, and any fish that were at all doubtful were put aside. Evidently the fish brought to the office and otherwise complained of had been kept too long before cooking.

Variola.—(a) Cases continued until 5th May, when the last case was discharged from the Isolation Hospital, but a few cases occurred at Swansea. (See “Variola.”)

(b) Free vaccination was continued at the office till the end of the epidemic during office hours, and in the earlier part of the year on Saturday afternoons and Sundays. As the epidemic subsided the number of applicants did so too, and lately none have offered themselves for vaccination except a few people going to the Fiji Islands.

(c) Numerous “suspicious” cases have been visited since the end of the epidemic, but all have been varicella.

(d) Outfits for isolation wards on several occasions were sent to Narrabri from the Hunter River District Isolation Hospital here. Except for transport all the work of packing was done by the Staff.

(e) As many cases of variola had occurred amongst tramway and railroad men it was thought advisable to give an opportunity for vaccination to the staff at Singleton. I proceeded there in March and stayed three days, including Sunday, attending the depot at the railroad station on the morning, afternoon, and evening of each day to give the men every chance of attending. The result was rather disappointing, as while a considerable number of men came to discuss the question only thirty-one offered themselves for vaccination.

(f) *Government Property.*—Outfits on different dates were sent by this office to the smallpox quarantine wards at Narrabri, and the property of the Hunter River District Isolation Hospital was finally either sent to Sydney or stored at the Mental Hospital, Stockton. All this work, which was very considerable, was done (except the mere transport) by the staff of this office.

Bacteriological Laboratory.—Only a few specimens were examined during the year, but material of various kinds was provided for medical practitioners on requisition.

Special Inspections.—A number of special inspections were made throughout the district, which will be referred to under the names of municipalities, shires, &c.

Re-inspections.—The appointment of Nurse Inspector Fletcher as a Sanitary Inspector, and under the Pure Food Act, enabled a number of re-inspections to be made which were very seriously required.

Reports.—3,325 reports and other documents were dealt with by this Office during the year.

PUBLIC HEALTH WORK DONE IN MUNICIPALITIES AND SHIRES.

Adamstown.—One Private Hospital was inspected. No dwellings were inspected, no prosecutions were undertaken and disinfections were reported. (See table.)

There are at present 370 pans in operation within the Municipality. 125 premises were connected during the year. As at this rate it will take three years or more before all the premises are sewered and the pans done away with, it has been suggested to the Secretary of the Hunter District Water Supply and Sewerage Board to verify this statement, and if considered advisable to enforce the compulsory section of the Act, and compel the property holders to connect with the sewer within a specified time. The Adamstown Sanitary Depôt is most elementary and can only be temporary. It has not been dealt with this year, as it was hoped that more progress would have been made in connecting premises with the sewer.

Carrington.—Is not yet connected with the sewerage system. Ordinance 45 seems to have been fairly well enforced. The depot is in a satisfactory condition and has been inspected several times during the year.

For a long time the Carrington “swamp” has been a cause of constant complaint. During the present year the Public Works Department undertook the reclamation, and work is now in hand on the above area, which is being filled in with sand by the Government dredger.

Greta.—Noxious Trades and Dairies were inspected in this District. The Sanitary Depot was inspected and instructions given for improvement in administration.

Hamilton.—Two hospitals were inspected. Eighteen buildings were inspected, of which ten were renovated, and three demolished. 753 pans still continue in use. There were 279 premises connected with the sewerage system.

Several inspections were made here for premises for a second Baby's Clinic and also a hospital, but none of them were decided on.

The Sanitary Depot was inspected several times and found in good order.

At one house a severe plague of fleas was reported. Specimens of these were sent to the Bureau of Microbiology and turned out to be the ordinary "dog flea." Instructions were given as to dealing with same.

Lambton.—The Sanitary Depot has been inspected several times and has not been found to be in a satisfactory condition. There has been a considerable amount of correspondence on the subject and regular inspections are still being made.

Inspections were made here for sites for Baby Clinics but no site selected.

Two buildings were inspected and closing orders issued.

East Maitland.—I am informed that all the cesspits have been done away with. It is satisfactory to confirm last year's report that the incidence of Typhoid Fever is less since the anti-typhoid inoculation depots were held. One Private Hospital was inspected.

West Maitland.—The sanitary depot was inspected and a steam plant which had not been used was brought into use. The hospital septic tank was inspected on several occasions, also four Private Hospitals and four buildings. Several visits were made to the Maitland Hospital to see "suspicious cases" which were supposed, but did not prove to be, variola.

Merewether.—The same condition of affairs continues in regard to sanitary matters as in the report for 1915, namely—"Although this town is now practically seweraged, there will always be about twelve pans which will require attention by the Local Authorities. I advised the Council in 1914 to arrange with an adjacent municipality in regard to this matter.

The Hamilton Municipal Council was approached on the subject, but no arrangement was made. As these pans are quite outside any sewerage reticulation, the owners are burying contents on their own premises."

Sites and premises were also inspected for Baby Clinics and Tuberculosis Dispensary, but none selected. Inspections were made of a subsidence from a coal mine, nuisance caused by an accumulation of water in Lingard-street, and a nuisance alleged to be caused by the sewerage outlet on Merewether beach, also one caused by a quarry-hole in Hickey-street. Reports *re* these were forwarded to the Department.

Merpeth.—The Sanitary Depot was inspected several times and is in a satisfactory condition.

Newcastle.—As stated in last Annual Report, an additional Sanitary Inspector is very urgently required, for without this, the house to house visitation, which is very urgently required, cannot possibly be carried on. The sanitary condition in regard to Frog Hollow is the same as in reports 1914 and 1915.

Garbage Destructor.—As already reported this is decidedly required.

Rats.—In 1915 the number of rats destroyed at 3d. per head was 2,015, but in the present year only 955 are reported as being destroyed. The Navigation Department periodically set baits on the wharf, but there are no statistics available.

Various inspections of sites for Tuberculosis Dispensary were made in Newcastle, but none seemed more suitable than the present site in Church-street West.

Owing to a case of cancer being reported in a wharf labourer, endeavours were made to have sanitary taps for the use of labourers on the wharf inaugurated. So far, however, this very desirable improvement has not been carried out. Various buildings, twenty-three in number, were inspected during the year, resulting in thirteen Closing Orders and two Demolition Orders. Several nuisances were also investigated.

New Lambton.—The provisions of Ordinance 45 are still not quite satisfactorily carried out. The Sanitary Depot has been inspected several times and a steam plant inaugurated. The conditions of the depot have not been satisfactory and it has been under supervision and continues to be so. Five houses were inspected, but statistics in regard to these and other matters have not been obtainable although the Council has been written to four times on the subject.

Raymond Terrace.—The Sanitary Depot here has been inspected three times and is in a satisfactory condition.

I had to proceed to Euwylong Public School to investigate a case of variola, which was the last case admitted into the Hunter River District Isolation Hospital.

I had again to visit Raymond Terrace to examine an accident case connected with Walsh Island.

Singleton.—This place was visited by me several times during the year in connection with variola cases.

I also visited Glenmy's Creek a few miles out. A special vaccination depot was held for Railroad Employees, but attendance was by no means good considering the time devoted to the depot. The

The Sanitary Depot was visited by me and was found to be in very good order. As complaints were made the premises of the Sanitary Contractor and his carts were inspected twice at different intervals and no nuisance was found.

Six Private Hospitals were visited and found to be in satisfactory condition.

Stockton.—Several visits were made here chiefly in connection with the Hunter River District Isolation Hospital for which see section Variola, &c.

The Sanitary Depot was visited several times and found in good order.

Wallsend.—The Sanitary Depot was visited and found to be satisfactory.

Waratah.—Three Private Hospitals were visited and reported on. The Newcastle Abattoir was inspected three times and found to be in a thoroughly satisfactory condition.

The Steel Works were visited several times in connection with an effluent which was said to be polluting the Hunter River.

Specimens of this were sent for analysis and reported on unfavourably. The Steel Works have since been making endeavours to deal with this matter and no complaints have again been received.

The Soap Works were visited in regard to a noxious effluent and suggestions made and no further complaints have been received.

Wickham.—The Sanitary Depot at Wickham has been inspected a good many times and instructions were given for a steam plant to be obtained and various details of administration were to be carried out. The Council has not been amenable in this matter and at the end of the year satisfactory progress had not been made. The matter is still in hand and frequent inspections are being made and much correspondence is being required. I inspected three buildings during the year. These have been reported as having been renovated.

Inspections were made of an alleged offensive effluent from the Gas Works which was said to be polluting the Styx Creek, but nothing offensive was discovered during these inspections.

During the year 310 premises are stated to have been connected with the sewage system, which leaves 1,000 pans still in use.

SHIRES.

Bolwarra.—As already twice reported, this Shire has no sanitary service, though one is required by each of the townships of Largs and Lorn. The original difficulty, however, still continues in suitable sites being procurable.

Cessnock.—There are only three sanitary services in this Shire which are satisfactorily conducted.

There are no garbage services, but the towns of Cessnock, Aberdare, and Kurri Kurri require them urgently.

Many inspections were made in regard to nuisances caused by Black Creek in Cessnock and hotels in Weston and Kurri Kurri. These seem to have been satisfactorily dealt with.

Lake Macquarie.—This Shire was visited several times in connection with variola cases and cases which were supposed to be variola.

I also inspected sites for cemeteries at Spier's Point and Teralba, but have not heard whether those sites were confirmed. A specially interesting prosecution for adulteration of milk was undertaken. The vendor supplied the patients at the Mental Hospital at Morisset, and on analysis the milk was found to be very much under regulation. The vendor was fined £30 and costs.

Port Stephens.—There are still no sanitary services in this Shire.

Tarro.—There still continues to be five sanitary services in this Shire.

NOTIFIABLE DISEASES UNDER THE PUBLIC HEALTH ACTS.

As information is frequently required from this Office as to what diseases are notifiable and on what dates they become notifiable, the following information may be useful:—

Typhoid Fever	Notifiable on and from 1st January,	1898.
Scarlet Fever	" " "	1898.
Diphtheria or Membranous Croup	" " "	1898.
Bubonic Plague	" 23rd January,	1900.
Infantile Paralysis (Acute Anterior Poliomyelitis) ...	" 1st February,	1912.
Acute Malarial Fever	" 17th March,	1915.
Epidemic Cerebro Spinal Fever (Meningococcal Meningitis)	" 11th October,	1915.

Cases

Cases of suspected plague or smallpox should be immediately notified by telegram, and cases of suspected leprosy by letter, addressed to the Medical Officer of Health, Hunter River Combined Districts, Newcastle.

By proclamation, under the Public Health (Amendment) Act, dated 17th February, 1915, Pulmonary Tuberculosis has been made notifiable in the Hunter River Combined Sanitary Districts.

Notification is to be made on a special form—obtainable from the Public Health Department, Newcastle—direct to the Medical Officer of Health of the Hunter River Combined Districts.

VITAL STATISTICS, &c.

DIPHTHERIA.

The appended Table shows the number of cases in the Hunter River Combined District which were notified, also those treated in hospital, and the attack rate and death rate from diphtheria per 1,000 of the population during 1916, also the number of cases notified in each month during the year. There were 20 deaths from diphtheria during the year.

TABLE C.

District.	Estimated Population.	Cases Notified.	Removed to Hospital.	Attack-rate per 1,000.	Death-rate per 1,000.
<i>Municipalities.</i>					
Adamstown.....	2,800	13	12	6.7	Nil.
Carrington	2,580	9	6	3.4	„
Greta.....	1,100	5	.....	4.5	„
Hamilton.....	9,040	14	12	1.5	„
Lambton	2,700	12	.....	4.4	0.37
Maitland, East.....	3,230	3	2	0.9	Nil.
Maitland, West.....	8,510	16	10	1.8	0.23
Merewether.....	4,350	15	7	3.5	Nil.
Morpeth	1,050	2	2	1.9	„
Newcastle.....	13,010	12	8	0.9	0.53
New Lambton.....	1,850	2	.....	1.03	Nil.
Raymond Terrace	900	1	1	1.1	„
Singleton	2,980	7	3	2.3	„
Stockton	2,210	2	2	0.94	„
Wallsend	2,750	16	23	8.05	0.71
Waratah	5,210	20	7	3.7	Nil.
Wickham.....	9,210	28	24	3.0	„
<i>Shires.</i>					
Bolwarra	3,250	1	.....	0.30	„
Cessnock	25,750	42	26	1.5	0.11
Lake Macquarie	16,630	17	10	1.02	0.18
Port Stephens.....	4,060	6	4	1.4	0.24
Tarro.....	6,700	5	2	0.73	Nil.

Notifications of Disease for each month.—January, 25; February, 23; March, 37; April, 31; May, 40; June, 11; July, 15; August, 14; September, 24; October, 23; November, 7; December, 14.

There was a total of 264 cases of diphtheria during the year. The year 1916 was the eighth year during which diphtheria has been present in the Hunter River Combined District, and it is unsatisfactory to find that there have been the largest number of cases since 1910 when the number notified was 373.

In the previous five years the notifications were as follows:—1911, 210; 1912, 177; 1913, 189; 1914, 171; 1915, 233.

The largest number of cases occurred in March, April, and May, and the lowest in June, July, November, and December.

All the Municipalities and Shires reported cases.

Two hundred and sixteen houses had one case each, eighteen houses two cases, and four houses, three cases each.

Schools.—Of those attacked thirty-eight attended various public schools in the district.

Milk Supply.—The milk supply was kept under careful observation. No case originated in a dairy, and there was no evidence connecting any of the cases with their milk supply. Ninety cases reported using no milk, fifteen owned cows, ten used condensed milk, and one reported using goat's milk.

Causes.—There seem to have been no special causes in connection with the cases outside those mentioned in my reports of 1915 and 1916 in connection with the Mackay outbreak in North Queensland in 1913. Probably, "Carriers" and undetected cases of the disease had much influence and also a want of care in connection with ordinary household articles and actions, also not sufficiently segregating sick cases. A more complete system of disinfections and more carefully applied knowledge on the part of the public would probably be beneficial.

Hospital.

Hospital.—Out of the 264 cases notified, 161 or 62·05 received hospital treatment, which is 6·95 per cent. more than in 1915.

Mortality.—Although the number of cases was the largest since 1910, the disease has been of a mild form, as the death rate per 1,000 of the population has been 0·15, as compared with 0·17 for New South Wales.

Disinfection.—Two hundred and thirty-eight houses had diphtheria cases, and of these houses only 136 are reported to have been disinfected by the Municipal or Local Authorities. Some Local Authorities report having done no disinfection at all.

SCARLET FEVER.

Table D of this report shows the number of Scarlet Fever cases notified in the Hunter River Combined District, the number treated in hospitals, and also the attack rate and death rate per 1,000 of the population for 1915, followed by number of cases notified for each month of the year. There were no deaths during the year.

TABLE D.

District.	Estimated Population.	Cases Notified.	Removed to Hospital.	Attack-rate per 1,000.	Death-rate per 1,000.
<i>Municipality.</i>					
Adamstown.....	2 800	5	.....	1 7	Nil.
Carrington.....	2 590	2	1	0 7	"
Greta.....	1,100	.....	.....	.....	"
Hamilton.....	9 040	8	.....	.....	"
Lambton.....	2,700	4	.....	1 4	"
Maitland, East.....	3,230	18	1	5 4	"
Maitland, West.....	8 510	21	5	2 4	"
Merewether.....	4 350	3	2	3 67	"
Morpeth.....	1,030	.....	.....	.....	"
Newcastle.....	13,010	12	.....	0·93	"
New Lambton.....	1,850	4	.....	2 1	"
Raymond Terrace.....	900	.....	.....	.....	"
Singleton.....	2,980	6	.....	2·03	"
Stockton.....	2 2 0	6	1	2 6	"
Wallaseid.....	2,790	7	.....	2 5	"
Waratah.....	5 210	2	.....	0 37	"
Wickham.....	9 210	5	.....	0 54	"
<i>Shires.</i>					
Boiwarra.....	3 230	1	.....	0·3	"
Cessnock.....	25,790	91	2	3 5	"
Lake Macquarie.....	16,630	10	.....	6 5	"
Port Stephens.....	4,060	1	.....	0 24	"
Tarro.....	6 760	3	.....	0·44	"

Notifications of Scarlet Fever for each month.—January, 15; February, 22; March, 14; April, 19; May, 11; June, 8; July, 10; August, 6; September, 31; October, 27; November, 27; December, 19.

Incidence.—During the year 1916 there were 209 cases. In the previous five years the notifications were:—1911, 264; 1912, 113; 1913, 110; 1914, 321; and 1915, 390. Cases were reported from all the districts, except Greta, Raymond Terrace, and Morpeth.

The largest number of cases occurred in September, October, and November, while the smallest number occurred in June, July, and August.

Cessnock Shire.—The number of cases was considerably added to by the 95 which occurred in Cessnock Shire.

Houses.—One hundred and eighty-eight houses had one case each, seven houses had two cases each, one house had three cases, and one house had four cases.

Schools.—Of the number attacked, eighty-four were attending one or other of the schools in the district.

Milk Supply.—Seventy-six persons stated that they used no milk, twenty-six owned their cows, seven used condensed milk, and none used goats' milk: eighty-three stated that they obtained their milk from dairies. No cases originated in dairies during the year, and there was no evidence to connect cases with their milk supply.

Hospital.—Of the 209 cases, 12 or 5·7 per cent. received hospital treatment.

Decrease of Notifications.—It is satisfactory to find that there was a considerable decrease of notifications as compared with 1915, though the decrease would probably be less if more disinfecting were carried out in the case of Scarlet Fever patients.

Mortality.—Although there were 209 cases, the disease was of a very mild form, there being no deaths in the Hunter River Combined District, compared to the rate of 0·6 for New South Wales.

Disinfection.—There were 209 cases reported, and 104 disinfections were carried out. This evidently means that a number of premises were either not disinfected or were disinfected by the owners or occupiers, which in all probability amounts to the same thing.

TYPHOID FEVER.

Table E shows the number of cases of Typhoid Fever notified in the Hunter River Combined District, the number treated in hospital and also the attack and death rates per thousand of the population during the year 1916, followed by the number of cases notified for each month of the year. There were twenty-one deaths during the year.

TABLE E.

District.	Estimated Population.	Cases Notified.	Removed to Hospital.	Attack-rate per 1,000.	Death-rate per 1,000.
<i>Municipalities.</i>					
Adamstown.....	2,800	.....	.....	...	Nil.
Carrington	2,580	2	1	0·7	"
Greta.....	1,100	1	1	0·8	"
Hamilton.....	9,040	1	.....	0·11	"
Lambton	2,700	6	1	2·2	"
Maitland, East.....	3,230	6	4	1·2	"
Maitland, West.....	8,510	12	5	1·4	0·70
Merewether	4,350	2	.....	0·4	"
Morpeth	1,030	2	.....	1·8	"
Newcastle	13,010	5	1	0·33	0·45
New Lambton.....	1,850	1	.....	0·53	"
Raymond Terrace	900	.....	.....	...	"
Singleton	2,980	1	1	0·3	"
Stockton	2,210	1	1	0·4	"
Wallsend	2,790	7	2	2·5	2·15
Waratah	5,210	2	.....	0·3	"
Wickham.....	9,200	7	4	0·7	"
<i>Shires.</i>					
Bolwarra	3,230	3	2	1·5	"
Cessnock	25,790	28	20	1·8	0·70
Lake Macquarie	16,630	11	7	0·75	"
Port Stephens.....	4,060	3	1	0·73	0·24
Tarro.....	6,760	5	1	0·74	"

Notifications of Enteric Fever for each month:—January, 20; February, 18; March, 21; April, 11; May, 8; June, 4; July, 1; August, nil; September, nil; October, 7; November, 9; December, 7. There was a total of 106 cases in 1916, which I think is the lowest record for this district except 1915.

Incidence.—Of the total number of cases notified during 1916, fifty-six were notified from fifteen Municipalities, and fifty from the five Shires. The notifications during the last five years have been, 1911, 131; 1912, 132; 1913, 121; 1914, 157; 1915, 105. The highest number of cases occurred in January, February, and March; which again is coincident with the fly and dust season.

The months for the smallest number of cases were July, August, and September, when no cases were reported.

Cases were reported from all the Municipalities, except Adamstown and Raymond Terrace.

The following Shires also reported cases:—Bolwarra, Cessnock, Lake Macquarie, Port Stephens, Tarro.

Houses.—Ninety-two houses had one case each, and seven houses two cases each.

Schools.—Of these attacked, thirteen were attending one or other schools in the district.

Milk Supply.—One case occurred in connection with a dairy at Greta, and the usual suitable precautions were taken.

Of the total cases fifteen owned cows, two used condensed milk, none used goats' milk, thirty-five stated they used no milk. The general milk supply was obtained from thirty-seven dairies. No cases occurred which could be considered to originate from the milk supply.

Hospital.—Of the 106 cases, 50 or 54·5 per cent. received hospital treatment.

Martin's Creek.—In July I was notified by the District Superintendent of Railways that he had been notified by the Wallarobba Shire Council that there had been an outbreak of Typhoid Fever amongst the families of the men working in the New South Wales Railroad Quarry at Martin's Creek.

The outbreak was attributed to the water from the Paterson River which supplied the camp.

On investigation I decided that the water was not to blame (in all probability, although no doubt the possibilities of contamination in the course of the river might be considered as numerous), but that the probable cause was an early case, conveyance by dust and flies, and also assisted by the structure of the latrines provided the camp-workers, as this particular structure admitted dust and flies to any extent.

As I am convinced from former experience with large camps, &c., it is almost hopeless to expect the usual directions in regard to boiling milk, boiling water, protecting food-stuffs from dust and flies, will be carried out, and in any case the individual fly or grain of dust cannot be avoided, therefore, I recommended anti-typhoid inoculation. Three depots were held at which the attendance was most satisfactory, the results being that

that out of a comparatively small population the following were inoculated, ages 3 to 68, with no bad effects :—

1. For the first inoculation ...	...	...	...	119
2. „ second inoculation ...	...	...	...	98
3. „ third inoculation...	...	...	...	51
Total	...	...	...	268

It seemed remarkable that there were so many volunteers for inoculation against typhoid while it has been so difficult a matter to get the population to undergo vaccination to protect them from smallpox. Possibly one death having occurred made the people more afraid of the latter than the former disease, and the results of inoculation do not seem to cause as much unpleasantness as vaccination. The doses given were firstly, 500 million, secondly, 500 million, thirdly, 1,000 million. Out of the total number inoculated (268) none reported any symptoms of a disagreeable nature, excepting occasionally very slight headache and backache. All who were inoculated were given a memo. asking them to notify the Public Health Department if any at any time ever suffered from an attack of Typhoid Fever subsequent to inoculation.

Inconvenience of Anti-typhoid Inoculation.—Having had a good deal of experience in anti-typhoid inoculation (including personal), I am interested to note that practically no inconvenience has been sustained by those inoculated, and so far as I know none of the men had to give up their usual work.

This experience seems to differ from various reports of military surgeons and others. During an epidemic at Winton, Queensland, a large number of shearers were inoculated by the Government Medical Officer, myself, and staff, and so far as I could ascertain none of these shearers failed to report for duty.

Possibly the fact that these shearers were receiving a high rate of pay per week lessened the tendency to cease work for small symptoms. It might be asked if many soldiers (I am an old soldier myself) would have found it necessary to “report sick” if by doing so they had lost the amount of wages or pay that the said shearers or others would have done. It has always been a puzzle to me why such a large number of specially selected men should be reported as having suffered so many inconveniences as seems to have been the case.

Widal Reaction.—I refer to my reports for 1914 and 1915 in regard to this subject.

Typhoid Investigation Forms.—I refer to my reports for 1914 and 1915 in regard to this special form.

Mortality.—The notifications were the fewest on record, and the mortality was 0·16 as compared with 0·11 for New South Wales, but at the same time it must be mentioned that after the statistics had been drawn up it was found that there might have been some error through the absence of notifications which had not been received, though the number would not be great.

Disinfection.—Of ninety-nine infected premises, sixty-eight are reported to have been disinfected. This would seem as though disinfection was not carried out as satisfactorily as was desirable, and the attention of municipalities and shires was drawn to this.

VARIOLA.

Table F shows the number of cases notified in the Hunter River Combined Sanitary District during the year 1916, and also the number of cases treated in Hospital, together with the attack rate and death-rate per thousand of the population, and the number of cases notified for each month of the year. There were no deaths during the year.

TABLE F.

District.	Estimated Population.	Cases Notified.	Removed to Hospital.	Attack-rate per 1,000.	Death rate per 1,000.
<i>Municipalities.</i>					
Adamstown.....	2,800	.....	.....	Nil.	Nil.
Carrington	2,580	.....	.....	„	„
Greta.....	1,100	.....	.....	„	„
Hamilton.....	9,040	.....	.....	„	„
Lambton	2,700	.....	.....	„	„
Maitland, East.....	3,230	.....	.....	„	„
Maitland, West.....	8,510	.....	.....	„	„
Merewether.....	4,370	.....	.....	„	„
Morpeth	1,050	.....	.....	„	„
Newcastle	13,010	5	5	0·43	„
New Lambton.....	1,850	3	3	1·5	„
Singleton	2,980	2	2	0·63	„
Raymond Terrace	500	.....	.....	Nil.	„
Stockton	2,210	.....	.....	„	„
Wallsend	2,790	4	4	1·5	„
Waratah.....	5,210	3	3	0·57	„
Wickham.....	9,210	10	10	1·06	„
<i>Shires.</i>					
Bolwarra	3,230	.....	.....	Nil.	„
Cessnock	45,790	.....	.....	„	„
Lake Macquarie	16,630	3	.....	0·16	„
Port Stephens.....	4,060	1	1	0·24	„
Tarro.....	6,760	.....	.....	Nil.	„

Notifications of Variolain each month.—January, 11; February, 10; March, 3; April, 4; May, nil; June, nil; July, nil; August, 3; September, nil; October, nil; November, nil; December, nil. There was a total of 31 cases of variola during the year 1916.

Incidence.—The year 1916 was the fourth year during which variola has been prevalent in the Hunter River Combined Districts. During the previous years the number of cases was 1913, 3; 1914, 48; and 1915, 400.

History of Variola, 1916.

As will be seen from the Report for 1915, the epidemic of variola had very considerably decreased at the end of that year, as on the 31st December, there were only 12 patients in the Hunter River District Isolation Hospital, namely, 7 males, and 5 females.

The epidemic, however, was not entirely at an end, as one case was admitted on 1st January, and there was a total of 11, namely, 5 males, 3 females, and 3 children admitted up to the end of what might be called the fourth outbreak.

This outbreak might be considered to have terminated on the discharge of the last patients on May 16th.

The isolation hospital was closed for the fourth time on May 31st.

The two last cases are of some interest in view of a later outbreak which occurred in Narrabri and surrounding district later. These cases had come from some distance from Collarenebri, but seemed to have been in Newcastle long enough to have contracted the disease there. If, however, the incubation period of smallpox is longer than the usually accepted time they may have become infected in the district they came from.

Cases Outside the Hunter River Combined Districts.

By instructions from the Director-General on January 19th I proceeded to Taree, Nahiack, Failford, Tuncurry, and Foster, to investigate cases in the vicinity of those districts.

These cases seemed to have originated in a case which occurred at Cundletown which was vaguely connected with Newcastle.

I had to investigate the following :—

1. A case occurring at Foster.
2. Cases which occurred in the Taree Hospital.

Foster.—One case, a female, had occurred here but the position was an exceedingly awkward one, as owing to the close relationship of the inhabitants of this township it might be considered that nearly every family was liable to infection as visits had been made either to or from the house during the infectious period. There was also an aboriginal camp within a few hundred yards of the residence.

In view of this, accompanied by the Government Medical Officer, Dr. Parramore, and the Officer-in-Charge of Police, I personally visited all the houses whose inhabitants had been in contact with the case, and pointed out to them that the position demanded wholesale quarantine (which would seriously interfere with the fishing industry) or wholesale vaccination.

I authorised Dr. Parramore to hold vaccination depôts both for the Foster inhabitants and the aboriginals, and the response was very satisfactory, about 150 of the former and nearly 200 of the latter being vaccinated.

The case (in default of any satisfactory means of transport across the river, &c.) was isolated and treated in the house which was in a lot of its own.

It is satisfactory to have to report that these measures appear to have been successful as no further case was reported.

The origin of this case is interesting as showing the infectiousness of the disease. For some weeks the patient had been visiting Taree Hospital to see her husband, who afterwards died as the result of a bite of a cat-fish. The husband was in a bed close to the window of a ward, and inside the ward, also close to the window, was a male patient who was afterwards isolated with smallpox. The visitor spoke to this patient through the open window, and it may be considered as certain that she caught the infection from him.

Taree Hospital.—Half-a-dozen cases had occurred in the hospital, including the matron, nurse, and the wardman. The place had been infected by a patient from Cundletown. At the time of my visit there were three cases under treatment.

The matron had been vaccinated three or four times at Grafton three years before, but the vaccination had never taken at any time. The nurse had been vaccinated, but had not taken either.

The wardman, aged 46, stated that he had been vaccinated in infancy, but there were no marks visible.

These cases had all been satisfactorily vaccinated, and no other ones were reported.

Swansea.—In August three cases of variola occurred in a house near Swansea.

The source of infection could not be traced, but members of the family had been in districts where the disease had existed. As the house was an isolated one, the patients were quarantined in it, and all contacts vaccinated and quarantined with the patients.

Vaccination depôts were held at Swansea and Catherine Hill Bay, and no further cases occurred.

Suspicious

Suspicious cases.—Subsequent to the decline, and it is to be hoped stamping out, of the epidemic, I had to visit numerous "suspicious cases" which occurred in different parts of the district, including Newcastle, Newcastle suburbs, Swansea, and West Maitland.

All the cases, however, were varicella, though much of it in a very atypical form.

All these cases were kept under supervision, and as many people in contact with them, and in the vicinity, vaccinated as would undergo the operation.

This was not done because of any doubt in the diagnosis, but because when people show a tendency to wish for vaccination it is decidedly advisable that their wishes should be complied with.

Vaccination (Medical Practitioners).—The Medical Practitioners in the district were very energetic in carrying out vaccination when requested to do so by the Department, and their efforts in this and their prompt notification of cases were a great help in stamping out the disease.

Police Department.—The Police Department in this (as in many other matters) gave very valuable assistance to this Department, and thanks are due to the Superintendent, Inspectors, and Constables for their very kind and efficient aid.

CEREBRO-SPINAL MENINGITIS.

There were no cases during the year 1915. During the year 1916 there were six cases, two of which occurred in the Municipality of West Maitland, and four in Cessnock Shire, one being at Abermain, two at Rutherford, and one in Neath. There were fifteen deaths.

A case occurred in a family at Heddon Greta which I had to investigate, but it could not be credited to this district, because the young man affected had been for some time in a military camp, and did not seem to have shown any symptoms till he reached Victoria.

Two cases were reported from the military camp at Rutherford, Cessnock Shire.

Another case, a girl (one of the West Maitland cases) was reported to have been at the Rutherford Camp about two days before she developed the symptoms and died.

It will be therefore seen that three of the district cases, and the one mentioned as developing in Victoria, all seemed to have been connected directly or indirectly with military camps.

Excepting the two cases from the Rutherford Military Camp, all occurred on separate premises.

INFANTILE PARALYSIS.

In the year 1915 there were no cases, but in the year 1916 thirteen cases were reported. These were distributed as follows:—Carrington, 1; Hamilton, 2; West Maitland, 2; Newcastle, 1; Stockton, 1; Waratah, 3; Wickham, 2; and Tarro Shire, 1.

These cases all occurred in different houses and, like cerebro-spinal meningitis, it was impossible to trace how the district became infected. There were two deaths.

MALARIA AND PLAGUE.

There were no cases of malaria or plague reported in 1916.

TUBERCULOSIS.

Phthisis Pulmonalis.—This disease became notifiable in the Hunter River Combined District during 1915. The work of this office consists in receiving the notifications, the Nurse Inspector visiting the houses of the cases, if not otherwise requested, and giving certain nursing and general instructions.

During the present year thirty-two cases have been notified with the following distribution: Lambton, 2; East Maitland, 1; West Maitland, 7; Merewether, 1; Morpeth, 1; Newcastle, 3; New Lambton, 1; Singleton, 2; Stockton, 2; Wallsend, 2; Waratah, 1; Wickham, 2; Cessnock Shire, 7. All these cases occurred in separate houses. There were thirty-nine deaths, being a percentage of 0.22 of population.

Whenever a patient changes his address this office is, or should be, notified, and arrangements are made for the premises to be disinfected. The same thing is done in case of the death of the patient.

During 1916 sixteen visits were made to notified cases and twenty-four disinfections were done after death or removal during the year.

Owing to the regulation of notification of change of address not being carried out, a great deal of work had to be done in tracing persons who had changed their residence, but all of them were eventually found.

Throat and Chest Dispensary.—This has continued under the charge of Dr. John Harris, G.M.O., the Hon. J. L. Fegan being hon. secretary, and the latter will probably furnish a detailed report.

The institution is not under the jurisdiction of this office, but Nurse Inspector Fletcher attends twice a week (Mondays and Thursdays, from 3 to 5 p.m.), to assist the Medical Officer-in-Charge.

I am informed that during the year there have been sixty-three patients attending the dispensary, who have made altogether 282 visits.

Inspections for new premises.—In accordance with the instructions received from the Minister of Public Health, a great many inspections of sites and houses suitable for new premises for the above institution were made, and all the house agents in Newcastle were requested to assist in the matter.

Up to the end of the year no sites for buildings or premises were found which were in any way improvements on the present buildings and site in Church-street.

BABY CLINICS.

The administration of this work was taken over early in 1915, when the Baby Clinics in Parry-street was established by the Hon. J. L. Fegan with two Baby Clinic nurses to carry out the work.

On the Notification of Births Act coming into force in February, 1915, the following municipalities of the district, Adamstown, Carrington, Hamilton, Lambton, Merewether, Newcastle, New Lambton, Plattsburg, Stockton, Waratah and Wiekham, were included in the regulation to the effect that the doctor, nurse, father, mother, or any person attending the patient must notify the birth with particulars to this office within thirty-six hours.

These notifications are entered in a book and the original sent to the Baby Clinics for the information to the secretary and the nurses conducting the work.

In 1915, 979 notices were received and forwarded by this office, and in 1916 1,283 such notices were received and forwarded.

Presumably this means that, at least, this number of visits was made by the nurses of the institution.

Statistics are not yet available to show what effect the Baby Clinics have on infantile mortality.

TABLE G.

The following table shows the number of deaths during the year ending 31st December, 1916, classified according to diseases, ages, and localities.

TABLE G.

Mortality Table, Hunter River Combined District, for 1915

[illegible]

All deaths in Institutions have been transferred to the usual places of residence.

Table G. shows the number of deaths in the H.R.C.D. for the year 1916 classified according to diseases, ages, and localities.

The total number of deaths registered during the year was 1,526. Deducting 46 deaths, who were not residents of the district, this number gives a death rate of 11.38 as compared with 10.68 for New South Wales.

Measles caused a death rate of 0.03 as compared with .04 for New South Wales.

Scarlet fever had a death rate of 0.00 as compared with .06 for New South

Diarrhœa and enteritis gave a rate of 1·038 as compared to ·75 for New South Wales.

Puerperal septicæmia caused a rate of 0·13.

Deaths in childbirth per 1,000 births had a death rate of 3·8 as compared to 5·70 for New South Wales.

Influenza caused a death rate of 0·07.

The rates for the notifiable diseases are given under the various headings. These rates are probably fairly accurate, but while calculating them it was found that there was a certain amount of discrepancy between the notifications received at this office and the probable number of cases. This matter has been investigated and rectified.

TABLE H.

Mortality Table for the Year 1915.

CAUSES of Infantile Mortality (Deaths of Infants under one year), Hunter River Combined District.

Causes of Death.	Total.	Municipalities.																	Shires.					
		Adamstown.	Carrington.	Greta.	Hamilton.	Lambton.	Maitland, East.	Maitland, West.	Mercurether.	Morpeth.	Newcastle.	New Lambton.	Plattsburg.	Raymond Terrace.	Singleton.	Stockton.	Wallsend.	Waratah.	Wickham.	Bolwarra.	Cessnock.	Lake Macquarie.	Port Stephens.	Tarro.
Typhoid Fever .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Small-pox .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...
Measles	12	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Scarlet Fever .....	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...
Whooping-cough.....	17	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	1	...	...
Diphtheria	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...
Influenza.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Plague .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Erysipelas .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Other Epidemic Diseases.....	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	...	...
Phthisis	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...
Tubercular Meningitis.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...
Other Tubercular Diseases .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Cancer .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Diabetes .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Alcoholism .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Other General Diseases	1	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Meningitis	6	...	...	...	...	...	...	1	...	3	...	...	...	...	...	...	...	1	...	...	1	...	...	...
Cerebro-spinal Meningitis.....	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...
Cerebral Hemorrhage	1	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Convulsions	14	1	...	...	2	...	1	...	...	...	...	...	...	...	...	...	...	3	...	3	3	...	1	...
Other Diseases of the Nervous System .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Diseases of the Heart .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Other Diseases of the Circulatory System .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Bronchitis	18	...	2	...	...	...	3	...	...	1	1	...	1	...	...	...	3	3	...	3	1	...	...	...
Pneumonia.....	22	2	...	...	...	...	3	1	...	4	...	...	...	...	1	1	3	...	...	6	1	...	...	...
Other Diseases of the Respiratory System .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Diseases of the Stomach.....	6	...	...	...	...	1	...	...	...	1	...	...	...	...	...	...	...	1	...	...	3	...	...	...
Diarrhoea and Enteritis	79	1	2	...	1	3	1	12	1	8	1	...	1	4	2	8	7	4	1	14	5	...	3	...
Appendicitis .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Hernia, Intestinal Obstruction.....	3	...	...	...	...	...	1	...	...	1	...	...	...	...	...	...	...	...	...	1	...	...	...	...
Cirrhosis of the Liver.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Peritonitis .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Other Diseases of the Digestive System	2	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Bright's Disease (Acute and Chronic).....	3	1	...	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Other Genito Urinary Diseases .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Puerperal Septicæmia .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Other Puerperal Diseases .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Prenaturity	111	4	...	1	6	5	2	9	4	11	1	...	3	5	4	3	11	7	3	19	7	3	3	...
Developmental Diseases	70	1	4	...	5	2	1	3	3	1	6	...	...	3	2	3	4	8	1	14	6	1	2	...
Senility.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Suicide .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Accident	3	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	1	1	...	...	...
All other causes	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	...	...	...	...
Total	372	10	8	1	17	10	5	34	14	1	43	3	...	5	13	9	16	28	32	5	71	33	4	10
Deaths under 1 year, per 1,000 Births	82	88	81	23	51	100	62	111	85	23	119	45	...	143	54	79	84	93	87	69	83	76	56	62

Total Number of Births.

Adamstown	...	...	...	114	Singleton	...	...	...	242
Carrington	...	...	...	99	Stockton	...	...	...	114
Greta	...	...	...	44	Wallsend	...	...	...	191
Hamilton	...	...	...	335	Waratah	...	...	...	302
Lambton	...	...	...	100	Wickham	...	...	...	368
Maitland, East	...	...	...	81	Bolwarra	...	...	...	72
Maitland, West	...	...	...	305	Cessnock	...	...	...	856
Mercwether	...	...	...	161	Lake Macquarie	...	...	...	437
Morpeth	...	...	...	44	Port Stephens	...	...	...	71
Newcastle	...	...	...	360	Tarro	...	...	...	160
New Lambton	...	...	...	67					
Raymond Terrace	...	...	...	35	Total	...	...	...	4,561

There were 4,561 infants born in the Hunter River Combined District during the year.

Mortality.—Infantile mortality is usually expressed in terms of the number of infants under 1 year of age per thousand registered births, and deals with the number of infants dying before the completion of the first year of life.

There were 372 infants who died before attaining 1 year of age, which makes a death-rate of 81·5 for the Hunter River Combined District, as compared with the mortality

mortality of 67·84 for New South Wales. The above infantile mortality rate is decidedly unsatisfactory, being very much higher than that of 1915, which was 77·06 and the rate is above, being 13·66 per 1,000 over the rate for N.S.W.

Deaths in Institutions.—There were 435 deaths in the different public institutions of the district during the year 1916, and of these 46 were deaths of persons outside the district.

DAIRIES.

During the year eighty-one dairies within twelve municipal districts were inspected and reported on to the different Local Authorities, and a copy of each report sent to the Health Department, Sydney.

In addition to the dairies situated in the municipal districts, ninety-two registered dairies situated in the Newcastle Police District were inspected and reported on by Sanitary Inspector G. H. Godfrey (Ass. Roy. San. Inst., London), whilst the District Dairy Inspector, Mr. W. Mackie, inspected and reported on the 192 dairy premises in the Maitland Police District, and 362 premises in the Raymond Terrace Police District.

These inspections are really carried out from this office in order to test the efficiency of Local Authorities in carrying out the administration of the Dairies Supervision Act in my district.

The following table will show the classification of the different dairies as to good or fair, and also will show the number of cattle examined and those destroyed as diseased :—

TABLE I.

Districts.	Total Number of Dairies.	General State.		Total Number of Cattle.	Number Destroyed.			
		Good.	Fair.		Tuberculosis.	Actinomycosis.	Cancer.	Other Diseases.
Adamstown	3	2	1	11	.....	.....	.....	.....
Greta	6	6	.....	47	.....	.....	.....	.....
Hamilton	2	2	.....	13	.....	.....	.....	1
Lambton	1	1	.....	8	.....	.....	.....	.....
Maitland, East	20	11	9	234	.....	.....	.....	.....
Maitland, West	21	20	1	287	.....	.....	.....	.....
Merewether	2	2	.....	7	.....	.....	.....	.....
Morpeth.....	3	3	.....	6	.....	.....	.....	.....
Newcastle.....	.....	.....	.....	.....	.....	.....	.....	.....
New Lambton	2	2	.....	56	.....	.....	.....	.....
Raymond Terrace	2	2	.....	6	.....	.....	.....	.....
Singleton	7	7	.....	15	.....	.....	.....	.....
Wallsend.....	10	10	.....	20	.....	.....	.....	.....
Waratah	2	2	.....	19	.....	.....	.....	.....
<i>Police.</i>								
Maitland (portion of).....	192	187	5	4,483	.....	.....	.....	.....
Newcastle	92	68	24	1,729	11	2	5	.....
Raymond Terrace (portion of)	362	288	74	7,362	32	8	3	.....

It will be seen that only one cow was condemned in the Municipal Area out of 729 milking, and eighteen in the Police District out of 1,729 milking.

NOXIOUS TRADES.

TABLE J.

The Noxious Trades Act was extended to this District in 1901. The Table appended shows the number of different kinds of business carried on in the various districts during the year 1916.

Districts.	Fat Extractors.	Pig Keepers.	Rag Picker.
<i>Municipal.</i>			
Adamstown	1	2	.....
Carrington.....	.....	.....	.....
Greta.....	1	1	.....
Hamilton .....	.....	.....	.....
Maitland, West	1	1	.....
Merewether .....	.....	1	.....
New Lambton	2	3	.....
Waratah.....	1	2	.....
Wickham .....	.....	.....	1
Wallsend	2	3	.....
<i>Shires.</i>			
Bolwarra	4	4	.....
Cessnock	24	24	.....
Lake Macquarie	12	12	.....
Port Stephens	5	5	.....
Tarro.....	15	13	.....
	67	71	1

As the Newcastle District Abattoir commenced killing in June, all premises within a 14-mile radius of the Newcastle Post Office were absorbed and consequently the killing in that area was done at the Abattoirs.

Having also erected an up-to-date fat extracting plant the Abattoir Board also treat their own offal, bones, hoofs, &c. The fat extractors' licenses issued by the Board of Health lapsed on 30th June, 1916, and most of the traders now sell their offal to the Abattoir Board. So that since July, 1916, there are now no fat extractors in Waratah, one in New Lambton, none in Adamstown or Wallsend (Wallsend and Plattsburg being amalgamated), and there are two less in Port Stephens Shire, and six less in Lake Macquarie Shire.

At the extension of the Act to this district in 1901 there were seventy-two licenses issued, compared with the 138 in 1916.

Eight of the pig-keepers also carry on poultry farming in connection with pig keeping.

All the above noxious trades premises have been visited at intervals during the year, and reports forwarded to the Local Authorities concerned, and also to the Health Department, Sydney, pointing out any improvements necessary.

PROSECUTIONS UNDERTAKEN BY THE LOCAL AUTHORITIES DURING THE YEAR
1916, AS REGARDS PUBLIC HEALTH MATTERS.

The Local Authorities in my district have the power to enforce Public Health matters under the undermentioned Acts: Pure Food Act, Public Health Act, Dairies Supervision Act, Noxious Trades Act, Cattle Slaughtering Act, and the following Local Government Ordinances: 39 (Public Health), 45 (Pans and Closets, &c.), 53 (Meat), 57 (Fish and Game).

When the Pure Food Act came into operation, the Board of Health by circular requested the Local Authorities in my district to nominate an Officer who would be appointed an Inspector under the Pure Food Act to carry out certain sections of that Act in regard to the taking of samples of milk for analysis and enforcing cleanliness of premises where food-stuffs are prepared or sold or stored for sale. All the Municipal Sanitary Inspectors, except two, were appointed as officers under the Pure Food Act.

TABLE K.

List of prosecutions undertaken by Local Authorities during 1916 in matters regarding the Public Health.

District.	Pure Food.	Public Health.	Dairy Supervision.	Noxious Trades.	Cattle Slaughtering Act.	Ord. 39.	Ord. 45.	Ord. 56.	Ord. 57.	Fines and Costs.
										£ s. d.
Adamstown	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Carrington	"	"	"	"	"	"	"	"	"	"
Greta.....	"	"	"	"	"	"	"	"	"	"
Hamilton	"	"	"	"	"	1	"	"	"	3 5 0
Lambton	"	"	"	"	"	Nil	"	"	"	Nil
Maitland, East.....	"	"	"	"	"	"	"	"	"	"
Maitland, West.....	"	"	"	"	"	"	"	"	"	"
Merewether	2	"	"	"	"	"	"	"	"	1 2 0
Morpeth	Nil.	"	"	"	"	"	"	"	"	Nil
Newcastle	"	"	"	"	"	"	"	"	4	3 16 0
New Lambton.....	"	"	"	"	"	"	"	"	Nil	Nil
Raymond Terrace	"	"	"	"	"	"	"	"	"	"
Singleton	"	"	"	"	"	"	"	"	"	"
Stockton	"	"	"	"	"	"	"	"	"	"
Wallsend	"	"	"	"	"	"	"	"	"	"
Waratah	"	"	"	"	"	4	"	"	4	10 18 0
Wickham	"	"	"	"	"	Nil	"	"	Nil	Nil
<i>Shires.</i>										
Bolwarra	"	"	"	"	"	"	"	"	"	"
Cessnock	"	"	"	"	1	4	"	"	1	20 14 0
Lake Macquarie ...	2	"	"	"	Nil	Nil	6	"	Nil	12 8 0
Port Stephens	Nil.	"	"	"	"	"	Nil	"	"	Nil
Tarro	"	"	"	"	"	"	"	"	"	"

The above table shows that the Councils do not seem to have availed themselves of these powers, as in the whole of the seventeen Municipal Districts the only prosecutions reported are from Hamilton, 1; Merewether, 2; Newcastle, 4; Waratah, 4; and Cessnock Shire, 6; and Lake Macquarie Shire 8 for the whole year.

Samples of milk were taken for analysis by Hamilton and Merewether Municipalities and Lake Macquarie Shire.

Newcastle took no actions under the Pure Food Act, and it would seem that in a city of some 15,000 inhabitants that some such actions would have been found to be necessary, and more especially as the work of the Department's Inspectors shows that constant and strict supervision is necessary at all times.

Table K shows that the only prosecutions undertaken by Municipal Councils and Shire Councils under the Pure Food Act were by Hamilton and Merewether and Lake Macquarie Shire.

Referring to the above, it may be mentioned that there is a strong tendency on the part of Local Authorities to shelve on to the Officials of Health Department most of the work which would entail a prosecution. During the year I have been requested on several occasions to inspect premises in order that action might be taken under the Public Health Act when the same could easily have been undertaken by the Local Authorities under their own Ordinances.

In these circumstances I have always endeavoured to encourage the Local Authorities to carry out what may be considered their own work and so avoid adding unnecessarily to the work of an understaffed office.

PURE FOOD ACT.

Inspector Godfrey of my staff condemned and destroyed as unfit for food the following:—

54 tins of tomato pulp used for making tomato sausages, each containing about 56 lb. weight.

45 lb. meat on board a steamer in the harbour (this was brought over in an open boat uncovered).

13½ dozen tins of groats, 8 dozen tins of cocoa, 30 dozen tins sardines, 425 dozen tins Anchovy paste.

Towards the latter end of the year, Miss Fletcher was appointed an Inspector under the Pure Food Act as it was considered necessary for Inspector Godfrey to have an Assistant Inspector. During the year, Miss Fletcher inspected 5 smallgoods shops, 34 fruit and refreshment shops, and served 38 notices *re* having running water for the washing of glasses, spoons, &c., in refreshment rooms.

Inspector Godfrey also went to Morisset and obtained samples of milk from a dairyman who was supplying the Mental Hospital with milk. The analysis showed that the first sample contained 33 per cent. added water, the second contained 37 per cent. added water, and the third contained 15 per cent. On being prosecuted the Magistrate fined the defendant £30 18s. in all.

Table L shows the number of samples taken and premises visited in my district by departmental officers during the year.

TABLE L.
Milk Samples.

Number.	Warnings.	Prosecutions.	Fines and Costs.
180	5	14	£ s. d. 63 5 0

TABLE M.
Premises—Inspections and Prosecutions.

Number Inspected.	Prosecutions.	Fines and Costs.
159	2	£ s. d. 10 10 0

Slaughtering Premises and Meat Inspection.—There were twelve premises licensed during the year ending 1916 in the municipal districts, and fifty premises licensed in the shire areas. In the abattoir area, which extends to a radius of 14 miles from the Newcastle post office, there were forty-six licenses issued in respect of twenty-six premises, which is accounted for by the fact that three or, perhaps, four butchers may kill at the one slaughter-house, although each must have a separate license to kill. All of these seventy-one slaughter-houses were inspected and reported on to the Local Authorities concerned as to their efficiency. Generally speaking, the premises were found in a clean condition. Since 30th June, 1916, all the killing within the abovementioned area has been carried out at the Abattoirs.

TABLE N.

The following table shows the number of animals slaughtered for human food in the licensed slaughter-houses in the district during the year 1916.

Municipalities.	Calves.	Bullocks.	Cows.	Pigs.	Sheep.
Greta.....	.....	91	93	16	527
Maitland, West.....	.....	250	150	30	750
<i>Shires.</i>					
Bolwarra (part of).....	.....	87	557	112	913
Cessnock (part of).....	290	2,548	2,694	2,276	11,682
Lake Macquarie (part of).....	20	270	80	20	100
Port Stephens (part of).....	13	147	504	91	939
Tarro (part of).....	284	1,254	1,020	623	18,540
	617	4,647	5,093	3,168	33,451

Outside of the abattoir area in the district the present system of meat inspection is far from satisfactory. It consists in the occasional visit to the killing house of an officer of the Local Authority of the district in which the slaughtering premises are placed.

TABLE O.

	Numbers Slaughtered.		Condemned as Diseased.			
			Numbers.		Percentage.	
	Cattle.	Swine.	Cattle.	Swine.	Cattle.	Swine.
Newcastle District Abattoir ...	18,364	7,529	78	14	4.24	1.85
All other parts of the Hunter River Combined District.....	10,352	3,168	58	Nil.	5.60	.....

The above table shows a marked difference in the condemnations made in that part of the district served by the abattoir, compared with the figures for the remainder of the district where a very imperfect system of meat inspection is carried out.

PROMOTION OF EFFICIENCY OF PUBLIC HEALTH WORK IN THE HUNTER RIVER COMBINED DISTRICT.

Referring to the above subject it is satisfactory to have to report the following in regard to the accommodation of the Public Health Department in the Hunter River Combined District.

Departmental Rooms.—As reported an additional adjacent office was obtained in 1915. During 1916 these rooms were thoroughly overhauled and renovated. A telephonette and electric radiator were installed in the M.O.H.'s private office, thus doing away with the necessity of going to the Inspector's room for every telephone message, and also with the old oil lamp that had been in use for many years and had served its time.

The additional room has been most valuable both from the point of view of the staff of this office, of members of the staff on various inspectorial tours who frequently come from Sydney and of the inquiring general public who come in in regard to every possible subject (frequently not connected with public health), and who often number more than twenty a day.

In addition to renovating, the offices have been nearly re-furnished and the increased facility for work naturally renders it more efficient.

Official Books.—A number of books are now kept on various official subjects which enable quick and ample reference to be made when information is required.

Library.—An attempt was made to inaugurate a small reference library for the use of the M.O.H. and staff. Owing to ordered economy not much could be done at present, but it is to be hoped that this will be permitted later.

Staff.—Constant inspection and re-inspection are required in a district of this kind and size if it is to be kept up to anything like sanitary perfection. The staff is too small for anything like to insure this, which is particularly noticeable in regard to Pure Food matters, and it would be very advisable to have a Food Inspector appointed who could follow out the duties entailed all the time.

Bacteriological Laboratory.—The laboratory requires thoroughly re-fitting and overhauling before it can be satisfactorily used for the required work. Lately nothing has been done in the way of examining specimens. In point of fact when the Newcastle District Hospital started a laboratory some little time ago the Departmental microscope was lent to the institution temporarily for their use.

If much bacteriology had to be done, in view of the increase of public health work, a laboratory assistant would be a necessity.

Notification of Infectious Diseases.—As duties and responsibilities under the Public Health Act, Part 3, Section 29, and especially in regard to Pulmonary Tuberculosis under the Public Health (Amendment) Act of 1915 do not seem to be quite understood, medical practitioners and Local Authorities should be periodically reminded of them.

District Registrars.—Should be instructed for the sake of accuracy to obtain the correct names and addresses of the persons who come to them to be registered or of those who are registered.

Typhoid Investigation Forms.—Suggestions for improving this form were made in the report for 1914 and 1915.

Vital Statistics.—As all efforts (even sending forms) have failed to obtain the necessary information from the various District Registrars, the Government Statistician is depended on for the figures required, as he has very kindly said that he would provide them quarterly or yearly—the latter being the best. It is quite clear that the M.O.H. has not time to visit and copy down the details from some thirty Registrars scattered all over the district.

Short Circuiting.—Local Authorities and others often write to Sydney on points which should first of all be submitted to this office.

This leads to unnecessary correspondence and a waste of time in dealing with the matters referred to.

Dairies.

Dairies.—There is also a very important matter which seems to me should be taken into consideration. At the present time there is no standard for an Inspector to adhere to as regards the constructions of milking bails and milk rooms, consequently each Inspector may have a different idea as regards what is necessary. Would it not be better for the Department to issue a plan and specification of a milking bail and milk room so that a uniform plan of action could be arranged for between the proprietor and the Department.

Enthetic Diseases.—As Newcastle, being a seaport, is more than usually liable to these diseases, it would be much benefited by a dispensary being opened for them.

It might also be well (after the war) that this clinic should be open in the evening for the treatment of men, women, and children for such diseases.

Hospitals.—I have again to report that experience gained in connection with hospitals both here and as Medical Inspector of North Queensland (where there was a Health Territory for over 200,000 square miles) leads me to the conclusion that the greatest efficiency is gained, and the most thorough efficiency maintained where the staff are not recruited locally, but are appointed from places not in the district.

The reasons for this are very much the same as those for the Health Department having the direct authority and supervision on all health matters.

Experience has also shown that a large number of local hospital committees show a very strong tendency to ask and defer to the opinions of anyone excepting their medical staff.

It would be very advisable if these committees could be impressed with the idea that the opinions of the medical staff in regard to hospital general affairs is of some value outside purely medical and surgical questions, and that the said staff have the interests of the patients and hospital just as much at heart as what may be called the subordinate staff and the hospital committee.

Throat and Chest Dispensary.—It might be advisable (when things get settled down after the war) to have the Throat and Chest Dispensary open in the evening, to enable men and women to come for treatment who state that they are unable to attend unless they sacrifice half a day's work. At the same time it must be noted that these people, generally speaking, do not seem to hesitate to lose "half a day's work" if the matter it is lost for is one of pleasure—as races, for instance.

Local Authorities.—Various portions of this report show that Local Authorities are not as energetic in discharge of their duties as is desirable in regard to health matters. There is no doubt that the tendency is to leave the bulk of the health work to the Public Health Department, and then to do everything possible to avoid carrying out the instructions received. Of course this cannot be said of all, but it occurs sufficiently often to show that for efficiency the whole Public Health administration should be in the hands of the Public Health Department.

I am more convinced of this than ever owing to experiences during the past year, and more especially in connection with sanitary depots, steam plants, and other matters.

There seems to be a great tendency to put things off by frivolous excuses, or to ignore them altogether, as very often letters written to the Local Authorities do not appear in the reports of the Council meetings, and not infrequently receive no answer at all. In one case (New Lambton) four letters were written recently for certain details, and no answers were received, neither could telephone messages reach the Town Clerk.

As a matter of courtesy more promptness should be shown in reply to inquiries and more especially as any communication to this office is promptly acknowledged with a "Will receive attention" notice.

The system of not replying leads to a great waste of time and much unnecessary correspondence and often leads to several "what action has been taken" notices having to be sent before a report on "action taken" is received. This is all the more unsatisfactory as frequently such reports have to be forwarded to the Director-General, Public Health Department, for his information, and it often looks as though the delay was caused by this office instead of by the delay of the Local Authorities.

Streets.—If Local Authorities would have all their streets named and numbered it would cause a great saving of time when any particular address is required.

Disinfection.—From the paragraph and table on this subject, it would seem that this might be more effectually carried out. Disinfection by the householder should be done away with altogether.

Combined Municipalities.—It would tend to greater efficiency and a considerable lessening of expense if all the Municipalities in the Newcastle District could be combined into a Greater Newcastle. Failing this, the following combinations would seem to be quite practicable and would be better than no combinations at all:—

1. Newcastle.—Population, 13,000, and Merewether, 4,350, total, 17,450.
2. Adamstown, 2,800, Hamilton, 8,950, Lambton, 2,700, and New Lambton, 1,850, total population, 16,300, or Adamstown and Hamilton, and Lambton and New Lambton might be made into combined Municipalities.
3. Wickham.—Population, 9,250, and Waratah, 5,100, total, 14,350 might form combined Municipalities.

Of course, the most satisfactory combination would be a Greater Newcastle taking in as many of the adjacent Municipalities as possible.

Noxious Trades.—On receiving an application for a license to conduct a Noxious Trade, the Sanitary Inspector of the Municipality or Shire should visit the premises and

Diagram showing the Monthly prevalence of Typhoid Fever and the incidence of this disease at different age-periods during 1915-1916.

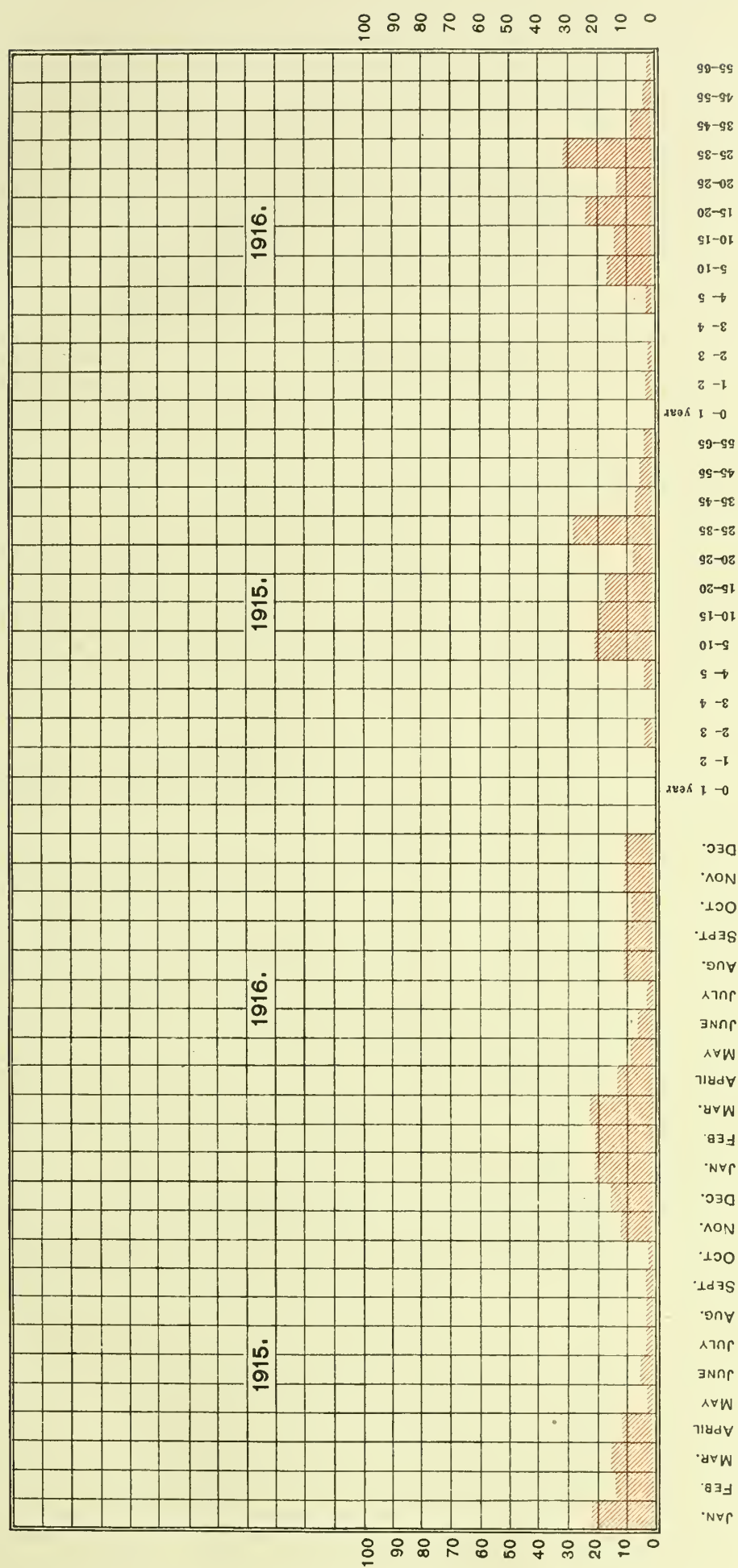
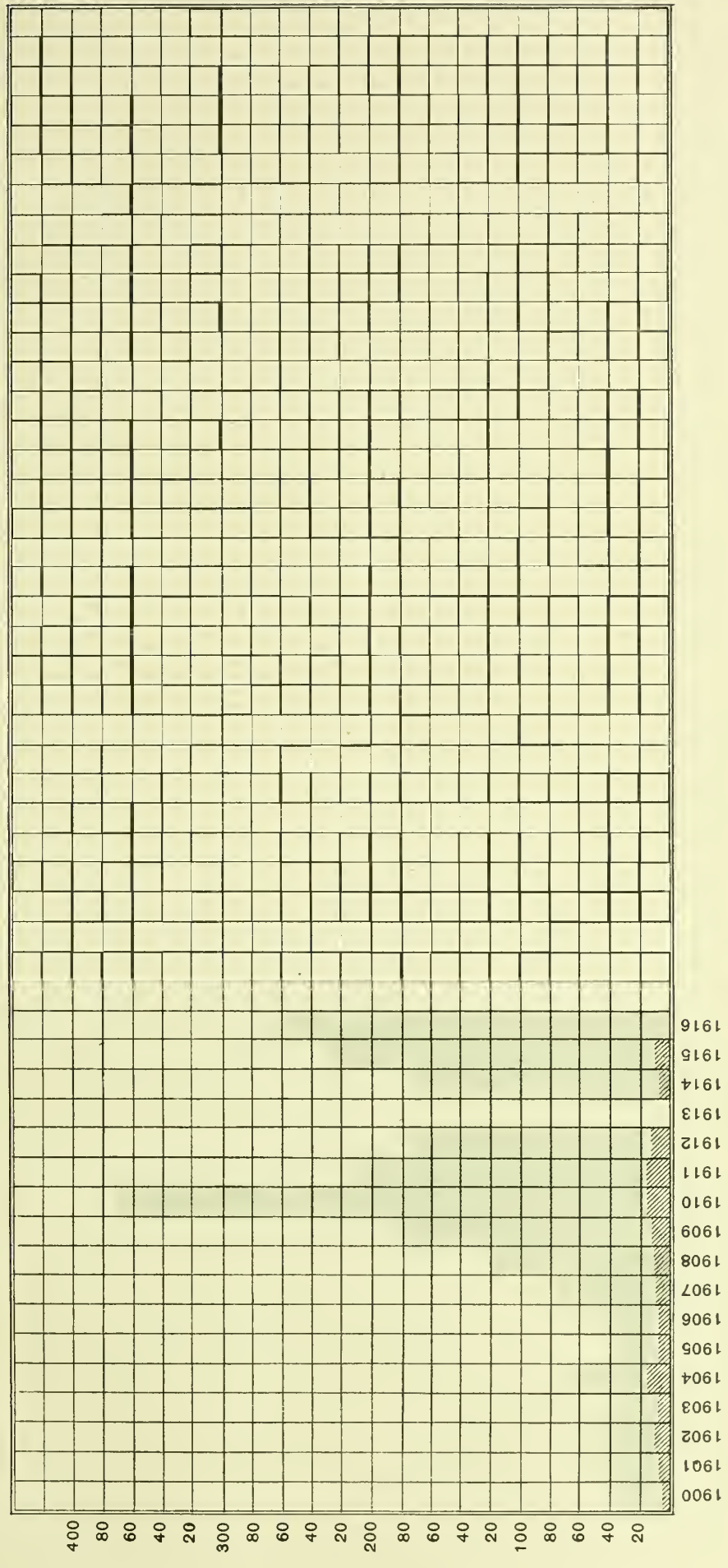


Chart II.

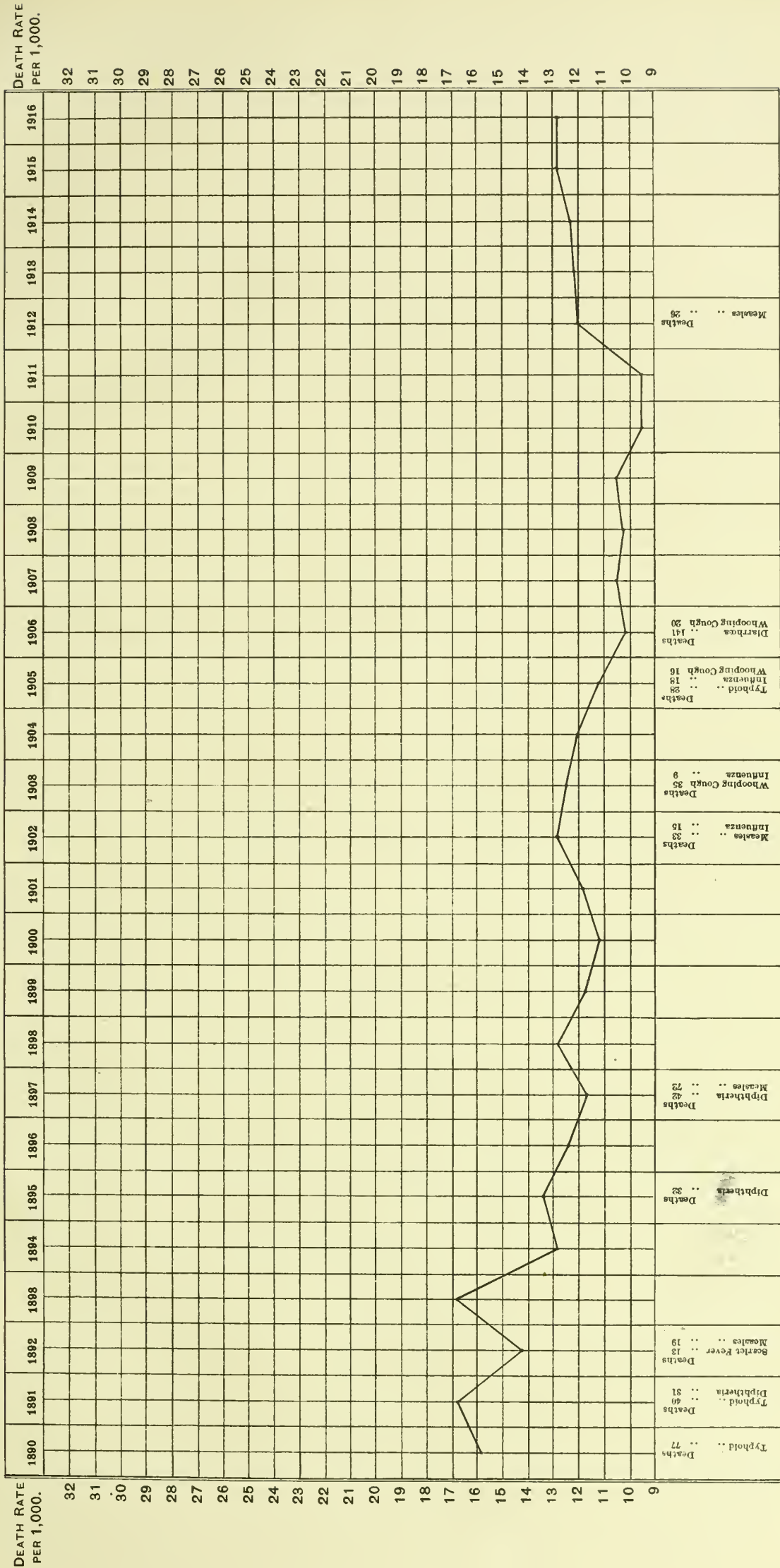
Notifications from Diphtheria and Deaths (shaded portion of columns) during 1900-1916, in the
Hunter River Combined Districts.



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Chart III.

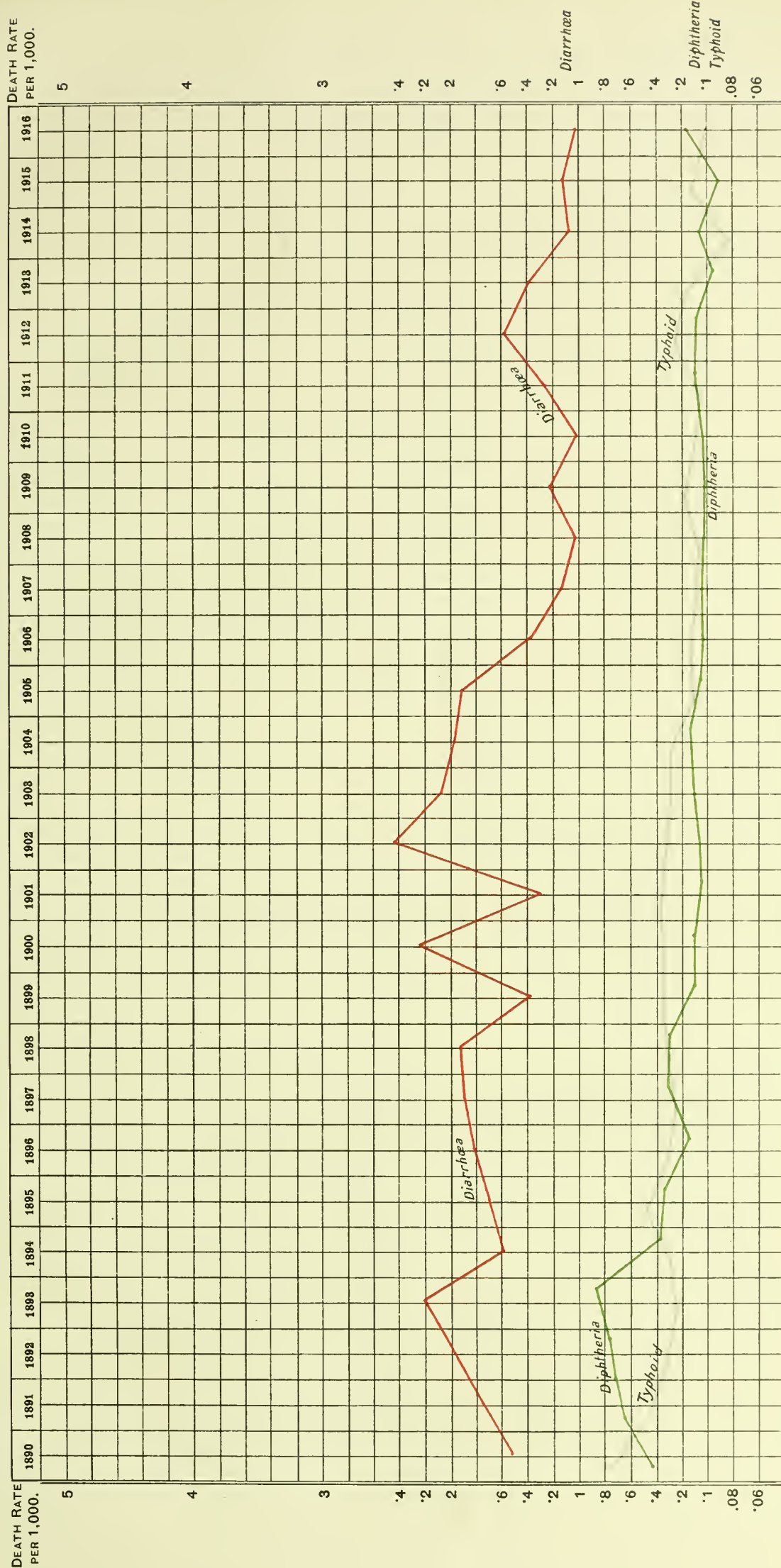
General Death Rate per 1,000 of the population in Newcastle and Suburbs for years 1890-1916.



1875

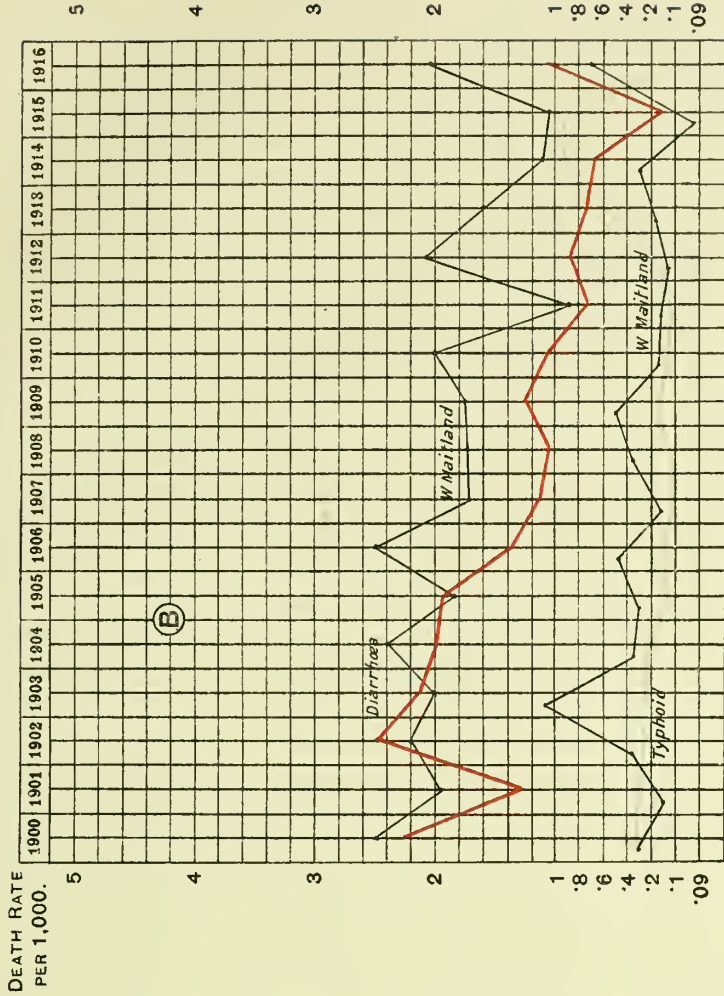
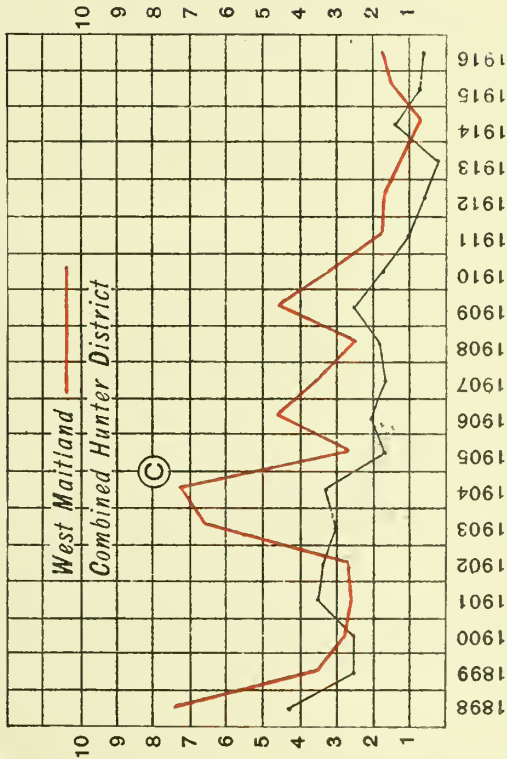
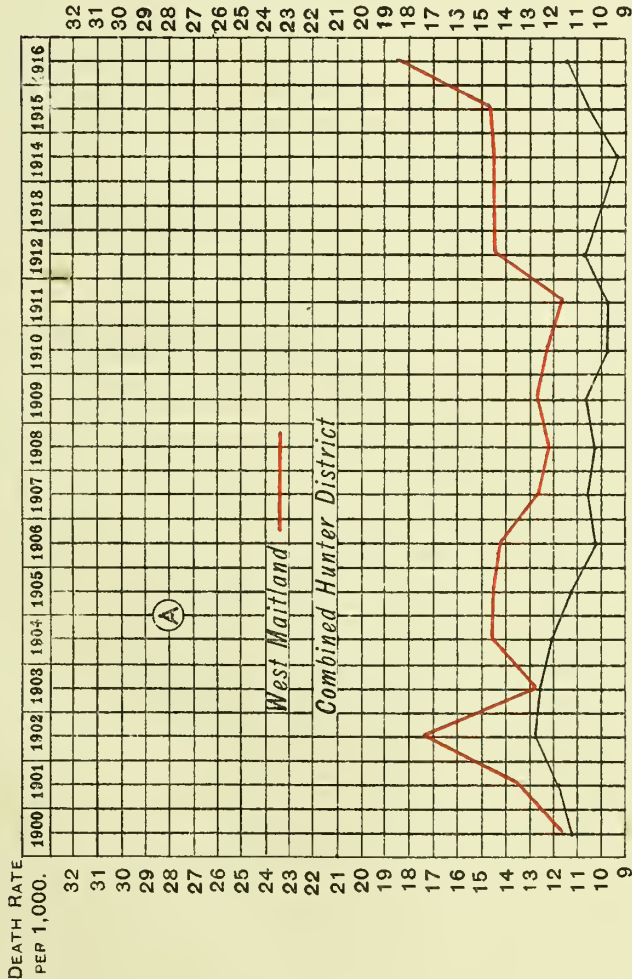
Chart showing Death Rate per 1,000 of the Population from Diarrhœa, Typhoid Fever, and Diphtheria
in Newcastle and Suburbs for years 1890-1916.

Chart IV.



LIBRARY
OF THE
INDIAN
NATION

Chart 5.—Diagrams showing the compared death rates from diarrhoea and typhoid and the general death rate of West Maitland and the Hunter River Combined District, showing how the West Maitland death rate has decreased since cesspits were gradually done away with.



- A—Death Rates in West Maitland and Hunter River Combined District per 1,000 of population.
 B—Death Rate from Diarrhoea and Typhoid Fever in West Maitland and Hunter River Combined District per 1,000 of population.
 C—Attack Rate from Typhoid Fever in West Maitland and Hunter River Combined District per 1,000 of population.

see that they comply with the regulation. If they do the registration of the premises should be issued by the Local Authorities and the registration sent to the Department of Public Health, Sydney, in the usual way, for issue of the license. At the present time, in the vast majority of cases, Local Authorities forward the applications on without inspection and the inspections have to be carried out by an officer of this Department.

Again it would seem that the fines imposed in pure food cases and for other breaches of the Public Health Act are not adequate to the offence committed.

In regard to pure food prosecutions especially, it is quite certain that the small amount of the fines imposed make it a paying transaction for the delinquent to be fined again and again, and at the same time continue in his illegal proceedings.

A fine should be of such a nature that it would be a distinct loss to the offender to be prosecuted a second or a third time, instead of being, as it very frequently is, a very mild reminder administered "in the most gentlemanlike way possible" to the effect that the offender has not quite complied with the law.

Motor for the Public Health Department of Hunter River Combined District.—In order to secure speed and efficiency in work a departmental motor car is very urgently required for the Hunter River Combined District, and it is almost remarkable that this matter has not been submitted before.

The size of the district is very considerable, and the methods of transport quite unsatisfactory, and frequently take a very long time, not to mention the fact that outside Newcastle and possibly West Maitland sulkies or cabs are frequently unobtainable.

If trams are used, in the few places where they are available, they frequently do not pass within a mile or two of the places to be inspected, and moreover, even to such approximate locality the trams only run at long intervals. This leads to considerable loss of time and to more walking than public servants should have to do, as their time can be more usefully spent than in "mud crushing."

Sanitary Inspector Godfrey has an allowance for a sulky which can be used usefully in the vicinity of Newcastle, but once outside that vicinity he has to transport his own bicycle for use or to get along otherwise as well as he can.

Consequently an individual inspection is made in a year where a motor would enable such inspections to be made three, four, or more times, which is what ought to be done. Under present conditions when any particular inspection has been made the individual whose premises or proceedings have been inspected can very safely calculate on a long time before another visit.

If the Department had the required motor such a feeling of security would not exist, and would tend to keep the district generally more up to the mark.

It would be very useful also for those officials of the Department who so frequently are detailed for duties from Sydney. The Public Works Department here have two motors for carrying out their duties, and certainly one is required by this Department.

Inspector Godfrey would be able to drive one and knowing how to manage a launch and being a good mechanic would very soon be efficient, and the M.O.H. would probably very soon learn.

It is probable that accommodation could be found on the premises, or if not easily in the vicinity.

This is a matter which should receive serious consideration on the earliest opportunity.

As Government departments as a whole seem to be in the possession of a considerable number of motors, it might be found possible to transfer one to the Newcastle Branch of the State Public Health Department of New South Wales.

I have, &c.,

J. BOOTH-CLARKSON,

D.P.H., D.T.M.H., Camb., &c.

Acting Medical Officer of Health, Hunter River Combined District.

INDEX TO CHARTS FOR REPORT 1916.

- CHART 1.—Diagram showing the monthly prevalence of typhoid fever and the incidence of this disease at different age-periods during 1915 and the preceding year.
- CHART 2.—Notifications from diphtheria and deaths (shaded portion of columns) during 1915 and in the preceding year, in the Hunter River Combined District.
- CHART 3.—General death rate per 1,000 of population in Newcastle and suburbs for year 1915 and the preceding year.
- CHART 4.—Chart showing death rate per 1,000 of population from diarrhoea, typhoid fever, and diphtheria in Newcastle and suburbs for year 1915 and the preceding year.
- CHART 5.—Diagrams showing the compared death rates from diarrhoea and typhoid and the general death rate of West Maitland and the Hunter River Combined District, showing how the West Maitland death rate has decreased since cesspits were gradually done away with.

3.—Broken Hill and District Public Health.

Report of the Medical Officer of Health for the Year 1916.

J. F. Bartley, M.B., Ch.B., Medical Officer of Health for Broken Hill and District
(part time).

I HAVE the honor to submit the following report on the condition of the public health of Broken Hill and District, and the work of the Sanitary Staff for the year 1916:—

Broken Hill is a large mining town, of about 30,000 inhabitants, in the far west of New South Wales. The city is, for the most part, built on and between a succession of parallel hills. The surrounding country away from the range of hills is sandy in nature and pastoral, with very sparse population. The mining in Broken Hill is silver, lead, and zinc; the lode material as well as the containing country rock is of a soft nature.

The staff employed by the municipality of Broken Hill consists of a Chief Sanitary Inspector and three sanitary inspectors, one of whom is a female. The sanitation of the districts outside municipal boundaries is in the care of the police, who also, under the Licensing Bench, assist in the sanitary inspection of hotels. The staff of the municipality of Broken Hill consists of:—

Mr. Con. Brosnan, Cert. R.S.	Chief Sanitary Inspector
„ R. G. Gamlen, do	Inspector
Mrs. A. H. Allen, do	Inspector and Trained Nurse
Mr. J. St. C. Larkey	Inspector and Sanitary Clerk

The Abattoirs are under municipal control, and in charge of Mr. O. Peters, who holds a certificate of meat inspector from the Technical College, Sydney.

There is no bacteriological laboratory in connection with municipal offices, but we take advantage of the willingness of the hospital staff to examine specimens.

Our Chief Sanitary Inspector also holds the position of Building Inspector under the ordinances.

Vital statistics for the year 1916:—

Population 30,000
Births 945—Males 452, females 464, being 33·73 per
thousand of the population, the figures for the previous five years
being:—

1915	1,027	Ratio	34·81
1914	1,246	„	37·76
1913	1,395	„	39·81
1912	1,326	„	39·0
1911	1,119	„	34·4

Deaths 432—Males 258, and females 174, a ratio of 15·42
per thousand, the figures for the previous five years being:—

1915	430	Ratio	14·56
1914	520	„	15·75
1913	651	„	15·6
1912	481	„	14·14
1911	438	„	13·5

Infantile Mortality.—The number of deaths of children under 12 months of age was 91, a rate of 96·3 per thousand births. The rates for the previous five years were:—1915, 99·31; 1914, 122; 1913, 143·38; 1912, 90; 1911, 86·7.

Marriages.—265. The numbers for preceding years were:—1915, 298; 1914, 350; 1913, 396; 1912, 402.

Notifiable Infectious Diseases.—The cases of notifiable infectious diseases notified in the municipality were as follows for 1916 and the five preceding years:—

	1916.	1915.	1914.	1913.	1912.	1911.
Typhoid ...	146	126	417	210	157	191
Scarletina ...	41	99	46	...	15	4
Diphtheria ...	532	442	573	641	56	238
Cerebro Spinal Meningitis	14	...	...	...	...	...

The outstanding feature of this table is the great increase in diphtheria, and the falling off in the number of cases of typhoid. The virulence of the epidemic in both these diseases has also been considerably modified.

The

The sanitary staff makes a close inspection of houses and districts where the cases are reported, and disinfect immediately after the removal of the patient to hospital, or on expiry of quarantine period when the patient is treated in the home.

The cases of cerebro-spinal meningitis reported were in most cases traceable to contact with one or other of the military camps in South Australia or the State.

Deaths—Infantile Mortality.—The chief causes of death of children under the age of 12 months were: Gastro-intestinal diseases, 36; prematurity, 27.

Infectious Diseases.—The deaths from notifiable diseases were:—Typhoid, 18; diphtheria, 20. The averages for the preceding five years were:—Typhoid, 22·2; diphtheria, 17·4.

Deaths from other causes were as follows (the figures in brackets being the averages for the preceding five years):—

Gastro Intestinal ...	31 (37·6)	Phthisis ...	19 (30·6)
Pneumonia ...	31 (48·4)	Cancer ...	25 (19·4)
Cardiac ...	30 (28·0)	Nephritis ...	25 (28·4)
Accidents ...	23 (33·0)	Senility ...	26 (19·2)
Puerperal ...	6 (12·0)	Cerebral... ..	17 (18·6)

Being a mining community, diseases of the respiratory system are usually more prevalent here than in non-mining places, but this past year has been very favourable in that respect, the figures under the heading of phthisis and pneumonia being a distinct improvement.

Gastro-intestinal diseases, especially in infants, are also a marked feature of diseases in Broken Hill, due to the great difficulty in procuring a satisfactory milk supply in the summer months.

I append reports from C. Brosnan (Chief Sanitary Inspector) and Mrs. A. H. Allen (inspector in charge of infectious diseases).

J. F. BARTLEY, M.B. Ch.B.,
Medical Officer of Health.

Report of Chief Sanitary Inspector for 1916 to the Medical Officer of Health, Broken Hill.

Sir,—

The undermentioned persons are in my staff:—

Mrs. A. H. Allen (Cert. R.S.I.), Trained Nurse.

Mr. R. G. Gamlen (Cert. R.S.I.).

Mr. C. Brosnan (Cert. R.S.I.), Chief Sanitary Inspector

Mrs. A. H. Allen attends to infectious disease patients (she is reporting on her work).

Mr. R. G. Gamlen accompanies Mrs. Allen, and inspects the houses in the vicinity, and serves notices when any insanitary condition is observed. These houses are then recorded in a book kept for that purpose in my office. He makes subsequent inspections to see if the terms of the notice have been obeyed. When he can be spared from the infectious diseases work he does ordinary inspection.

I am Chief Sanitary Inspector and Inspector under the Public Health Act, Local Government Act, Dairies Supervision Act, Cattle Slaughtering and Diseased Animals and Meat Act, Noxious Trades Act, Pure Food Act, and Building Inspector, also I am the Council's prosecutor for breaches of these Acts and for sanitary fees.

Public Health Act.—In addition to Mrs. A. H. Allen's report, there was a house-to-house inspection, &c.

1 House had a closing order obtained against it.

88 House-to-house inspections.

5 Houses demolished.

17 Houses brought up to the standard after preliminary notices had been served on the owners.

Local Government Act.—There were 5 persons prosecuted for dirty premises and convictions obtained.

Dairies Supervision Act.—The registered dairies were inspected frequently, also milk vendors. There are:—

24 Registered dairies. (No. of inspections, 285.)

18 Milk vendors. (No. of inspections, 168.)

193 Cows milked.

There was one prosecution for a breach of the Act. The places have been kept clean.

Cattle

Cattle Slaughtering and Diseased Animals and Meat Act.—The Council have a meat inspector at the abattoirs, but as there are a number of homestead blocks close to Broken Hill, with large flocks of sheep, there has been meat brought into Broken Hill without inspection, and sold to the public. The Broken Hill Abattoirs Act was so drafted that it is almost impossible to get a conviction for breaches of the Act.

Number of butchers' shops, 44 (licensed), in addition to 17 smallgoods shops.
620 inspections of butchers' shops and 215 inspections of smallgoods shops.

Noxious Trades Act.—Sixteen premises are licensed to carry on a noxious trade—14 pig-keepers, 2 fat-melters. Total inspections of same, 190; 1,850 pigs is the total average for the year.

The drift sand is a great drawback to these yards, as it is necessary to remove the sand daily by means of a horse and scoop.

Pure Food Act.—There are 270 shops where food is sold and stored. These have been inspected at intervals. In the month of January I notified the vendors of butter that each pound of butter should have the weight stated on the wrapper, which was complied with.

Twenty-one samples were taken—two were found to be adulterated and the vendors fined £10 and £2 respectively. Owing to our analyst not having been gazetted for Broken Hill I was unable to take more samples until the year was further advanced. I prosecuted one man for selling adulterated fish. He was fined £3 and costs, and two persons for smoking tobacco in a fish shop—one was fined 5s. and the other 10s. I seized and destroyed 225 lb. of fish, 50 dozen tins of preserved fruit, 62 dozen eggs, and 112 lb. of butter.

Building Inspector.—There were 282 buildings and alterations for the year. Mr. Gamlen inspected in connection with his work investigating the causes of infectious diseases, 981 houses, subsequent visits 519; closets, 3,721, subsequent visits 2,738; yards, 3,407; boarding-houses, 20, subsequent visits 15.

In addition to the other food shops there were 30 licensed for the sale of fish.

981 houses were inspected where infectious disease has occurred.

981 subsequent inspections to see if the terms of the notices served had been complied with.

Yards and closets were inspected monthly.

There are 7,000 houses in the city. Area of city, 16 square miles.

Yours faithfully,

C. BROSANAN, C.S.I.

Report of Sanitary Inspector in charge of Infectious Disease for Year ended 31st December, 1916.

Sir,

I have pleasure in presenting you with a brief report of work done for the twelve months ending 31st December, 1916.

Infectious Disease.—718 cases of infectious disease were reported from the city district for the above period, viz.:—146 typhoid fever, 532 diphtheria, 41 scarlet fever, and 14 cerebro-spinal meningitis. Eighteen additional cases were brought in from outside districts, and admitted to the Broken Hill Hospital—7 typhoid fever, 8 diphtheria, and 3 cerebro-spinal meningitis.

Hospital Admission.—473 cases of those notified in the city, as well as the 18 brought in from country districts, were admitted to the hospital.

Supervision.—980 visits were made for supervision of quarantine and to arrange for disinfection of premises, also to deal with hospital cases, as explained in previous reports.

Milk Supply.—475 of the cases reported in the city used condensed milk; 142 were supplied by registered dairies; 30 private cows; 16 own goats; 5 tru-milk (or powdered skim-milk); 50 no milk used.

Water Supply.—Since the introduction of the Umberumberka water, there has been less rain water used than formerly, although many preferred to drink stored rain water, owing to the objectionable smell and discoloured condition of the town supply.

Disinfection.—758 houses were disinfected, including bed, clothing, &c. These include the notifiable diseases, also houses where phthisis patients were removed from, as well as those brought in from outside districts to friends, before admission to the hospital.

At present every notifiable infectious case is disinfected by the local authority free of charge. Where special disinfection is desired, a small charge of 2s. 6d. per room is made.

House

House Inspection.—850 houses were inspected in different parts of the city. Those needing strict attention were reported and dealt with by Chief Inspector Brosnan.

Special Complaints.—230 visits to dirty homes, and special complaints were made. Several of those responsible attended to the order to clean up rooms, bed, clothing, &c., although it is difficult to achieve any lasting good with people of this class, as they change their address frequently, and with each change feel free to lapse back again to their old indolent carelessness.

Boarding-houses.—Eight only, in the worst locality, were kept under supervision. Owing to a large number giving up boarders during 1915, much time was lost trying to discover who had re-started a lodging or boarding house, and who had given up entirely. It would greatly facilitate supervision if the people who cater for boarders or lodgers for a living were requested or compelled to register annually.

Schools.—It may be of interest to state that 384 of the notifiable infectious diseases did not attend any school. Those attending school numbered 334, or 1·113 of the population. Added together, all those who contracted infectious disease in the city works out approximately 2·393, assuming the population to be 30,000.

The following clearly shows how each school fared:—North, 96; Central, 76; Burke, 58; South, 48; East Infants, 3; Railway Town, 4; Private Infants, 2. Catholic Combined—Central, 20; South, 7; North, 15; Railway Town, 5; total, 47.

Wards.—Wills Ward, which extends north from Sulphide-street, is much larger in area, and consequently more in population, than any other ward in the city, which explains the great difference in the figures for this ward. The table of wards following will show how the disease of diphtheria was scattered in each ward during the same months.

In regard to typhoid fever, Wills Ward is slightly lower than during 1915. Sturt Ward shows an increase, 48 being reported, against 33 for 1915. This may be accounted for owing to the mines working better, and a large number of men who had gone away returning to Sturt Ward.

The boarding-houses and restaurants are situated chiefly in this locality, which makes it convenient for the men who have no homes or are strangers to Broken Hill. Burke Ward was exceptionally light in regard to fever, nine cases only being reported for the twelve months.

Table of wards in regard to infectious diseases attached hereto.

TABLE of Wards *re* Infectious Diseases :—

1916.	Diphtheria.				Typhoid.				Scarlet Fever.				Cerebro Spinal Meningitis.			
January	18	6	8	6	5	9	...	1	...	...	...	2	...	...	...	...
February.....	12	7	7	5	2	7	1	2	1	...	...	...	...	...	...	...
March	25	12	6	1	5	4	...	4	1	2	1	...	...	...	...	...
April	30	12	15	13	4	3	1	3	1	...	...	...	...	...	...	...
May	27	12	11	7	10	5	1	3	...	...	1	3	...	1	...	...
June	34	24	7	7	6	7	...	3	3	3	3	2	1	...	...	...
July	28	17	12	20	3	1	...	2	2	2	2	...	...	...	...	...
August	14	8	5	9	...	...	1	...	2	3	...	...	...	1	...	...
September	12	3	...	5	1	...	...	...	3	...	...	1	...	2	...	4
October	6	8	2	4	8	2	...	1	1	1	...	...	...	...	...	2
November	15	1	1	6	5	8	1	3	1	...	...	...	...	1	...	1
December	16	9	4	5	10	2	4	3	...	...	...	...	...	...	...	1
Total.....	237	119	78	88	59	48	9	25	15	11	7	8	1	5	...	8

COMPARATIVE Figures of Wards for Years 1915 and 1916 :—

	Wills Ward.		King Ward.		Sturt Ward.		Burke Ward.	
	1916.	1915.	1916.	1915.	1916.	1915.	1916.	1915.
Diphtheria	237	197	88	89	119	80	78	78
Typhoid	59	65	25	11	48	33	9	13
Scarlet Fever	15	40	8	28	11	21	7	12
Cerebro Spinal Meningitis	1	...	8	...	5	...	...	...
Total	312	302	129	128	183	134	94	103

A. H. ALLEN,
Sanitary Inspector.

PART III.

Report on the Outbreak of Mild Smallpox in New South
Wales, 1913-16.

PART III.

OUTBREAK OF MILD SMALLPOX IN NEW SOUTH WALES,
1913-1916.

By W. G. ARMSTRONG, M.B., Ch.M. (Syd.), D.P.H. (Camb.), Senior Medical Officer of Health for New South Wales.

During 1916 New South Wales continued to be affected by the mild type of smallpox, which was introduced from Canada in 1913. The outbreak steadily declined throughout the year. The total number of persons ascertained to be attacked was 107 compared with 471 during 1915. The only portions of the State affected were the Metropolitan area, the Newcastle and Lower Hunter River area, the North Coastal area, and the North-western district of the State. With the exception of the Metropolitan area no cases were reported in New South Wales south of a line drawn from Coonamble to Newcastle, and all the cases in the Metropolitan area were either introduced from the north or were traced directly to cases so introduced.

During the first four months of the year cases continued to occur in the Newcastle area and were removed for treatment to the Isolation Hospital at Stockton, but the number of admissions to this hospital steadily declined, and it was finally closed on 31st May, the last patient having been discharged on 18th May. The total number of cases in the Newcastle and Lower Hunter River area was thirty-three.

Outside the Newcastle area the only localities in which any considerable numbers of cases occurred were Narrabri (thirty cases) and Walgett (eleven cases). Both of these towns are situated in the north-west of New South Wales.

The type of the disease experienced presented no deviations from that observed in the years 1913, 1914, and 1915. It continued very mild in its manifestations and no deaths occurred among those who were attacked. More cases were observed, however, than in previous years in which the period of incubation tended to be prolonged. In several instances in which it appeared possible to fix with some accuracy the time of infection, the period which elapsed between the acquirement of the infection and the earliest appearance of the rash was as long as eighteen days, and in one instance this period was prolonged to twenty days, but in this case the evidence of a single exposure to infection was not quite so definite as might be desired for scientific accuracy.

The demand for vaccination continued poor, except in the Newcastle, Narrabri and Walgett districts, where considerable numbers of persons were vaccinated by private practitioners. Of official vaccinations, only 2,618 were recorded throughout the State.

TABLE showing the number of Persons ascertained to be suffering from Smallpox during each week of 1916.

Cases recorded to January	1	.....	Nil.	Cases recorded to July	1	.....	4
"	8	.....	6	"	8	.....	3
"	15	.....	10	"	15	.....	3
"	22	.....	4	"	22	.....	1
"	29	.....	5	"	29	.....	14
"	February 5	.....	2	"	August 5	.....	9
"	" 12	.....	5	"	" 12	.....	1
"	" 19	.....	2	"	" 19	.....	2
"	" 26	.....	2	"	" 26	.....	Nil.
"	March 4	.....	Nil.	"	September 2	.....	4
"	" 11	.....	Nil.	"	" 9	.....	1
"	" 18	.....	1	"	" 16	.....	Nil.
"	" 25	.....	Nil.	"	" 23	.....	6
"	April 1	.....	2	"	" 30	.....	Nil.
"	" 8	.....	3	"	October 7	.....	Nil.
"	" 15	.....	3	"	" 14	.....	Nil.
"	" 22	.....	Nil.	"	" 21	.....	Nil.
"	" 29	.....	Nil.	"	" 28	.....	Nil.
"	May 6	.....	Nil.	"	November 4	.....	Nil.
"	" 13	.....	2	"	" 11	.....	Nil.
"	" 20	.....	Nil.	"	" 18	.....	Nil.
"	" 27	.....	7	"	" 25	.....	Nil.
"	June 3	.....	Nil.	"	December 2	.....	Nil.
"	" 10	.....	1	"	" 9	.....	Nil.
"	" 17	.....	Nil.	"	" 16	.....	1
"	" 24	.....	3	"	" 23	.....	Nil.
				"	" 30	.....	Nil.
				Total.....	107		

TABLES showing the Distribution of Cases of Smallpox occurring during 1916.

(a) Metropolitan District.		(c) Remainder of State.	
Municipalities—		Municipalities—	
City of Sydney	3	Coonamble.....	1
Auburn.....	2	Kempsey (from s.s. "Yugilbar").....	1
Manly	1	Narrabri.....	30
Newtown	1	Narrabri West.....	2
Parramatta.....	2	Moree.....	1
Prospect and Sherwood (Guildford)	2	Tamworth	2
Randwick	2	Taree	2
Willoughby (Chatswood).....	2	Walgett.....	1
Shires—		Shires—	
Hornsby (Beecroft)	1	Erina (Wyong)	1
	15	Hastings (Wauchope)	1
(b) Hunter River District.		Manning (Cundletown)	2
Municipalities—		Manning (Forster)	1
Newcastle	13	Stroud (Buladelah).....	1
New Lambton	3	Walgett (Burren Junction)	1
Raymond Terrace.....	1	Police Districts—	
Singleton.....	2	Walgett (Collarenebri)	2
Wallsend	4		
Waratah	3		
Wickham (Islington).....	4		
Shires—			
Lake Macquarie	3		59
	33	Total.....	107

TABLE showing Number of Attacks, under Sexes and Age Groups.

Age-group	—1		—5		—10		—20		—30		—40		—50		—60		Over 60		Total attacks.		Total.
Sex.....	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	—
Attacks	2	2	4	7	4	3	16	10	26	12	10	2	3	1	2	2	...	1	67	40	107

A question which here presents itself as worthy of very serious consideration is the following:—Are the health authorities of New South Wales justified in further maintaining their attitude of special watchfulness against this particular form of smallpox;—is it necessary or desirable to continue the campaign, which it must be remembered is a fairly expensive one, against a disease which is after all no more deadly than chickenpox? For that is the plain truth about this particular type of smallpox, which invaded New South Wales in 1913, and is still existent in some parts of the State. Among the 2,275 cases which have come to the knowledge of the authorities up to the close of the year 1916, there have been but four deaths recorded, and in each of these four instances there was some other condition existing concurrently with and independent of the disease smallpox, which was in itself sufficient to account for death.

At the time of the first introduction of the disease, and for many months afterwards there can be no question that the proper attitude of the health authorities was that actually adopted by them. The disease responded to every clinical and scientific test for smallpox which could be applied to it. It was in fact smallpox, and although after a few months the fact emerged that the type of the disease was extraordinarily mild, the authorities were by no means convinced that it would continue so.

But the behaviour of the disease during a period of nearly four years has made it tolerably clear that no increase of virulence is to be reasonably anticipated. The epidemic of smallpox in New South Wales to-day is as regards virulence and clinical features unaltered from the type of the disease that was introduced early in the year 1913.

The principal arguments which justify a continuation of the efforts of the health authorities to stamp out this disease may very briefly be stated. In many instances the effects of attacks of this mild form of smallpox have been very disfiguring. Except in the mildest cases the complexion and features of women who have undergone attacks have been permanently disfigured in a greater or less degree. The disease also tends to produce abortion when it attacks pregnant women. Add to these facts that the eruption is a very loathsome one, and that a great deal of pain and discomfort precede and accompany an attack, and a fairly good case emerges for the enforcement of strong repressive measures. Finally the attitude of the adjoining States of the Commonwealth has no little bearing upon the question. They have all apparently escaped infection so far (probably because they are better vaccinated than New South Wales), and they are naturally apprehensive of invasion from this State, and would strongly resent any slackening of the precautions which are being taken to check and limit the spread of infection here.

 PART IV.

 Report upon the State Hospitals and Asylums under the Control
 of the Director-General of Public Health.

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PART IV.

REPORT upon the State Hospitals under the control
of the Director-General of Public Health.

1.—THE COAST HOSPITAL, LITTLE BAY, SYDNEY.

REPORT FOR THE YEAR 1916.

The Acting Medical Superintendent to The Director-General of
Public Health.

The Coast Hospital, Sydney, 1917.

Sir,

I have the honor to submit the following Report on the working of the Coast Hospital during the year 1916.

Staff.

Honorary Physicians.—Alfred Walter Campbell, M.B., M.S., M.D. (Edin.); James Macdonald Gill, M.D. (Lond.), L.R.C.P. (Lond.), M.R.C.S. (Eng.).

Honorary Surgeons.—Charles Percy Barlee Clubbe, L.R.C.P. (Lond.), M.R.C.S. (Eng.); Sir Herbert Lethington Maitland, M.B., M.S.; George Henry Abbott, M.B., M.S.; Hon. John Brady Nash, M.D., M.S. (Edin.), M.R.C.S. (Eng.), M.L.C.; Sir Alexander MacCormick, M.B., M.D., F.R.C.S. (Edin.), F.R.C.S. (Eng.).

Honorary Gynæcologists.—Ralph Worrall, M.D., M.S. (Ire.); Hugh Corbet Taylor Young, M.B., M.D. (Glas.).

Honorary Ophthalmic.—Charles Gordon McLeod, M.D., M.B. (Edin.).

Resident Medical Staff.

Medical Superintendent.—Reginald Jeffery Millard, M.B., D.P.H. (on leave with Australian Expeditionary Forces).

Acting Medical Superintendent.—Donald Wallace, M.A., M.B., Ch.M.

Assistant Medical Officers.—*Thomas Maynard Furber, M.B., Ch.M.; *James A. James, M.B.; *Thomas J. Frizell, M.B.; *James Manning Hair, M.B.; †Albert Leslie Stafford, M.B., Ch.M.; †William John McCristal, M.B., B.S.; Arnold Llewelyn Lance, M.B.; †Frederick Short, M.B.

(* On leave with Australian Expeditionary Forces. † Relieving officers on leave with A.I.F.)

Manager.—R. Goldrick.

Matron.—Miss Alice Watson.

Dispenser.—Miss M. W. Fitz-Gibbon.

Clerk and Storekeeper.—W. Dwyer.

2. *Statistics.*—Detailed tables of statistics will be found in the Appendix, but I may summarise here the more important of these.

1.—The following table is a comparative general statement for 1916 and the previous year:—

	1915.	1916.
Remaining in Hospital on 31st December	424	431
Admitted during the year	4,806	4,618
Total cases under treatment during the year	5,214	5,042
Discharges, including deaths	4,790	4,611
Deaths	198	171
Death-rate per cent. of total discharges	4.13	3.7
Average daily number of occupied beds	440	447
Average stay of patients (in days).....	30.9	32.29

For the year, the number of admissions was 188 less than in 1915, and the average daily number of occupied beds was 447, as against 440 in 1915. The average stay of patients increased from 30.9 days to 32.29 days.

II.

II. *Infectious Diseases*.—The following Table summarises the work of the year in regard to these, and affords a comparison with 1915. In this Table the “cases” are cases treated until discharge or death, and the fatality is reckoned on the total cases treated. Cases remaining in hospital on 31st December, 1916, are not included in these figures for the year.

	1915.			1916.		
	Cases.	Deaths.	Fatality.	Cases.	Deaths.	Fatality.
Typhoid Fever	104	10	9·6	79	8	10·1
Scarlet Fever.....	1,228	19	1·5	968	22	2·2
Diphtheria	940	35	3·7	1,149	32	2·8
Measles.....	359	2	·5	208	1	·004
Whooping-cough	4	...	...	41	9	22
Erysipelas	50	8	16	48	1	2·1
Mumps .....	...	...	...	230	...	...
Variola	14	...	...	22	...	...

Typhoid Fever.—The number of cases under treatment was less than in 1915; the fatality was more.

Scarlet Fever.—Was less prevalent than in 1915—2,715 cases being notified in the whole Metropolitan area during 1916 as against 4,723 during 1915, and the cases treated at the Coast Hospital showed a corresponding decrease. There were 22 deaths, 7 of which occurred within seven days after admission.

Diphtheria.—In the Metropolis the cases notified amounted to 2,829 in 1916, as against 2,351 in 1915, and the cases treated at the Coast Hospital were 1,149 as against 995 in 1915. The percentage of notified cases which came to this hospital for treatment was—in 1915, 33 per cent.; and in 1916, 39 per cent. Of the 32 fatal cases, 16 died within seven days of admission. Intubation was performed on 9 patients, and tracheotomy on 3.

Antitoxin was administered in the hospital to 659 cases. In view of the prevailing diversity of opinion as to the appropriate dosage of Antitoxin, it may be of interest to record briefly the amounts used here, which were as follows :—

Antitoxin.	Cases.	Percentage of Total Cases.	Antitoxin.	Cases.	Percentage of Total Cases.
2,000 units	15	2·3	34,000 units	1	·15
4,000 „	41	6·2	36,000 „	2	·3
6,000 „	137	20·8	38,000 „	1	·15
8,000 „	182	27·6	40,000 „	9	1·4
10,000 „	99	15	42,000 „	2	·3
12,000 „	35	5·3	50,000 „	8	1·2
14,000 „	11	1·7	54,000 „	1	·15
16,000 „	19	2·9	60,000 „	1	·15
18,000 „	7	1·1	70,000 „	4	·6
20,000 „	50	7·6	82,000 „	1	·15
22,000 „	4	·6	90,000 „ .....	...	...
24,000 „	4	·6	120,000 „ .....	...	...
26,000 „	2	·3	130,000 „ .....	...	...
28,000 „	1	·15	140,000 „	1	·15
30,000 „	19	2·9	152,000 „	1	·15
32,000 „	1	·15			

Altogether 2,366 cases of scarlet fever, diphtheria, measles, and whooping-cough were treated in the Infectious Division, as against 2,725 cases in 1915. In the Appendix will be found further details concerning these cases, viz. :—

Table VI.—Number of cases of diphtheria, scarlet fever, and typhoid fever notified within the Metropolis, and the percentage of these cases admitted to the Coast Hospital in each of the years 1898–1916 inclusive.

Table IV.—Typhoid fever. Age and sex distribution.

Table V.—Diphtheria. Age and sex distribution.

Table VIII.—Fortnightly admissions of cases of typhoid fever, scarlet fever, diphtheria, and measles.

Table VII.—Duration of stay in hospital of cases of typhoid fever, scarlet fever, and diphtheria.

Table XIII.—Cases of infectious disease admitted, and deaths from the several diseases, for each year since 1884.

3. *Expenditure*.—The total expenditure during the year 1915 was £32,139 2s. 2d. In 1916 it was £36,857 7s. 4d., an increase of £4,718 5s. 2d.

Occupied beds.—The daily average number of occupied beds in 1915 was 440. In 1916 the number rose to 447—an increase of 7.

Net cost per occupied bed.—The average cost per occupied bed in 1915 was £69 5s. 7d. In 1916 it was £77 4s. 11d.

Table XI gives a detailed statement of the working expenses in 1916.

Receipts.—The revenue and other collections in the year 1915 amounted to £756 0s. 5d., and in 1916 to £1,470 19s. 9d.

4. *Nursing.*—Miss Watson continued as Matron. Instruction by lectures and demonstrations was, as usual, given to the Nurses by the Medical Staff and Matron; and in invalid cookery by a specially engaged teacher (Miss K. Harriott), as in former years. Examinations were held in accordance with regulations, with the following results :—

First-year examination	...	...	...	...	...	26
Second-year	„	...	...	...	...	25
Third-year	„	...	...	...	...	29
Fourth-year	„	...	...	...	...	30

During the year 12 certificated nurses left the hospital to take up private nursing, whilst 3 left for military duty.

Sick leave was granted to 79 nurses, amounting in the aggregate to 2,840 days. Of these nurses, some were ill on more than one occasion, there being 122 cases of illness altogether. Of the nurses sick, 12 had typhoid fever 172 days, 13 had diphtheria 652 days, 8 had scarlet fever 343 days, and 6 had measles 119 days. With the exception of Nurse Miles, who, I regret to state, died from pneumonia, the others recovered satisfactorily.

5. *Laboratory.*—The following Table summarises the work done in the hospital laboratory month by month. In all 9,785 diphtheria cultures were examined. The practice was continued of accepting no diphtheria culture as negative unless found so after forty-eight hours' incubation.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Diphtheria cultures :—													
1. Examined after 12-24 hours' incubation.....	816	784	978	1165	1111	881	729	874	937	567	517	426	9,785
2. After further 24 hours' incubation .....	...	...	...	...	...	...	...	...	...	...	...	...	...
Negative for K. L. at first examination, and re-examined.....	620	601	721	875	848	677	548	530	762	447	334	402	7,365
Of these, found positive at second examination	94	51	161	118	114	111	87	109	145	68	24	16	1,098
Percentage	15.2	8.5	22.3	13.7	13.4	16.4	15.9	20	19	15.2	7.2	4	14.9
Sputum for Tubercle	11	3	4	4	3	3	3	4	1	4	8	1	49
Leprosy smears .....	...	2	...	...	...	...	...	...	...	...	...	...	2
Gonorrhoeal smears.....	3	6	12	5	4	6	6	3	4	...	6	1	56
Widal tests .....	...	...	3	2	3	...	4	...	...	...	...	...	12
Pus smears for organisms .....	...	...	2	...	...	...	...	...	...	...	...	...	2
Blood counts, &c.	7	2	3	...	...	1	2	...	...	4	1	6	26
Pus smears for T.B., &c. ....	...	2	1	...	...	...	...	...	...	...	...	...	3
Blood examinations for Malaria .....	...	...	...	2	1	...	...	...	...	...	...	...	3
Urine for casts, &c.	1	3	3	8	4	12	11	8	12	8	4	...	74
Urine for Tubercle bacilli .....	...	...	...	...	...	...	2	...	...	...	...	...	...
Smears for Vincent's Aeneia.....	2	...	...	...	1	...	...	1	...	...	...	...	6
Cultures for B. Pestis .....	...	...	...	...	...	...	...	...	...	2	...	...	...
Sundry examinations .....	...	...	1	...	...	...	...	...	...	...	...	...	3
Smears for Spirochaetes.....	...	...	...	...	...	1	...	...	...	...	...	...	1
Smears for K.L. Throat	2	1	...	1	2	2	...	1	...	...	...	...	9
Cerebro-spinal fluid.....	...	...	...	1	...	1	1	3	2	...	3	1	12

6. *Additions, Alterations, &c.*—The principal works carried out during the year 1916 by the hospital staff were the following :—

- i. Re-roofing of Ward No. V and medical officers' quarters; renovating of wards in general division; alterations, repairs, &c., stores, offices and residential quarters; providing additional room for medical officer; general repairs lazaret buildings; making medicine cupboards and other furniture for new units and other wards.
- ii. Painting of buildings in general division.
- iii. Extending fence and opening up additional area in vegetable garden; fencing off other portion of the hospital grounds.
- iv. Erection of retaining wall, clearing, draining, and cultivation of ten acres of land used for producing green crops for cattle, and
- v. General improvements of lawns and gardens.

I have, &c.,

R. GOLDRICK,
Manager.

DONALD WALLACE,
Acting Medical Superintendent.

APPENDIX.

TABLE I.—General Statement of the working of the Hospital from 1st January to 31st December, 1916.

	Males.	Females.	Total.
Number of beds available in the General Division on 31st December, 1916	113	56	169
" " Infectious Division			238
" " Nurses' Sick Room			4
Total accommodation			411
Number of inmates remaining in hospital on 31st December, 1915...	246	178	424
" admitted during the year 1916	2,628	1,990	4,618
Total treated	2,874	2,168	5,042
Discharged—Cured	1,910	1,790	3,700
" Relieved	586	100	686
" Unrelieved	43	11	54
Died	80	91	171
Total number discharged, or who died...	2,619	1,992	4,611
Remaining in hospital on 31st December, 1915	255	176	431
Average daily number resident	447		
Average residence of discharged patients in days	32.29		
Rate of mortality on total number who were discharged or who died	3.7		
Total cost of maintenance and treatment of indoor patients	£36,857 7s. 4d.		
Average cost of patients per annum	£77 4s. 11d.		

	Males.	Females.	Total.	Total Visits.
Outdoor relief—				
Total number of individuals who received relief	634	526	1,160	2,092
Total cost of Outdoor Relief.....	£32 1s. 0d.	£33 8s. 0d.	£65 9s. 0d.	

Hospital Staff on 31st December, 1916.

Medical and Administrative.	Number.	Nursing.	Number.	General.	Number.
Medical Superintendent	1	Sub-Matron..	1	Foreman	1
Assistant Medical Officer	4	Sisters.....	6	Artisans	9
Manager.....	1	Housekeeper	1	Attendants, Out-door	5
Matron.....	1	Probationers	40	" 	10
Dispenser	1	Pupil Nurses	66	Telephone attendant..	1
Clerks	4	Wardsmen...	8	Male Cooks	3
Total	12		122	Female Cooks	3
				" Servants	16
				Laundresses	8
				Needlewoman	1
					57
				Total Staff.....	191

TABLE II.—Return showing the number of Wards, together with the cubic space and number of beds in each Ward, in the General and Infectious Divisions of the Coast Hospital for the year 1916.

Ward.	Cubic Space.	No. of Beds.	Cubic space per Bed.	Ward.	Cubic Space.	No. of Beds.	Cubic space per Bed.
1	32,100	33	972	11	22,320	24	930
B.....	10,800	14	771	12	23,880	25	955
2	10,368	12	864	13	28,236	44	641
3	12,000	10	1,200	14	43,520	71	613
4	12,900	11	1,172	15	28,296	28	1,010
5	31,368	25	1,254	16	11,520	16	720
6	10,800	8	1,350	17	16,915	30	563
7	10,800	8	1,350	Nurses' Sick Room	3,546	4	864
8	32,268	24	1,344				
9	12,000	12	1,000	Total	366,447	411	28,648
10	12,900	12	1,075				

TABLE III.—Diseases other than Infectious--Discharges and Deaths during 1916, distributed under sex and age.

Age.	0-5		6-10		11-15		16-20		21-30		31-40		41-50		51-60		61-70		71-80		81-90		91-100		Total.	
Sex.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Cases treated.	72	66	34	29	34	29	119	58	44	3	182	190	103	133	52	124	34	107	19	17	3	4	2	...	1,277	577
Deaths. ...	3	12	2	1	1	...	2	3	3	10	7	10	8	4	8	5	5	7	6	1	...	...	...	...	45	53

Mortality, 5.95 per cent.

TABLE IV.—Typhoid Fever—Discharges and Deaths during 1916, distributed under sex and age.

Age.	0-5		6-10		11-15		16-20		21-30		31-40		41-50		51-60		61-70		71-80		81-90		Total.	
Sex.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Cases treated...	3	3	2	6	3	6	1	6	12	15	5	11	3	2	1	...	...	...	...	...	...	...	30	49
Deaths .....	...	...	...	...	1	1	...	...	...	2	1	2	...	1	...	...	...	...	...	...	...	...	2	6

Mortality, 9.62 per cent.

TABLE V.—Ages and Sexes of Diphtheria cases.

	Male.	Female.		Male.	Female.
Under 1 year	15	13	20-24 years	33	50
1 year.....	68	35	25-29 „	13	21
2 years.....	59	50	30-34 „	12	9
3 „	64	65	35-39 „	6	9
4 „	55	61	40-44 „	3	1
			45-49 „	1	...
Total under 5 years ...	231	224	50-54 „	2	1
			55-59 „ .....	...	1
5-9 years.....	144	181	60 years and over .....	...	...
10-14 years	23	71			
15-19 „	38	40	Total	541	608

TABLE VI.—Showing Number of Cases of Diphtheria, Scarlet Fever, and Typhoid Fever notified within the Metropolis, and the percentage of these cases treated at the Coast Hospital, in each of the years 1898-1916 inclusive.

	1898.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.	1916.
<i>Diphtheria.</i>																			
Cases notified in Metropolis.	613	285	278	439	393	690	738	695	659	659	880	1,144	2,109	1,834	2,632	2,045	2,244	2,551	2,829
Cases treated at Coast Hospital.	27	25	7	65	64	92	301	313	267	389	360	500	909	974	1,284	994	1,057	940	1,149
Percentage	4.40	8.77	2.51	14.80	16.30	13.33	40.80	45.03	40.51	59.03	40.91	43.70	43.10	53.10	48.7	48.6	47.10	36.85	40.6
<i>Scarlet Fever.</i>																			
Cases notified in Metropolis.	2,425	556	464	884	1,253	2,910	1,361	1,136	1,869	976	1,153	836	394	369	304	555	1,801	4,726	2,715
Cases treated at Coast Hospital.	350	134	116	150	313	585	371	284	503	336	420	339	150	134	108	287	715	1,224	938
Percentage	14.43	24.10	25.00	16.96	24.98	20.10	27.26	25.00	27.45	34.43	36.43	40.55	38.07	36.31	35.5	51.71	39.70	25.9	35.7
<i>Typhoid Fever.</i>																			
Cases notified in Metropolis.	824	786	983	829	610	833	665	561	485	505	678	700	812	488	535	566	644	821	654
Cases treated at Coast Hospital.	163	148	247	214	144	166	178	139	84	101	118	96	85	66	67	77	81	104	79
Percentage	19.78	18.83	25.12	25.81	23.60	19.93	26.77	24.77	17.32	20.00	17.40	13.71	10.46	13.52	12.5	13.78	12.58	12.67	12.1

TABLE VII.—Duration of Stay of cases of Typhoid Fever, Scarlet Fever, and Diphtheria.

Duration of Stay.	Typhoid Fever.			Scarlet Fever.			Diphtheria.		
	Cured.	Died.	Total.	Cured.	Died.	Total.	Cured.	Died.	Total.
1 week or less	2	4	6	6	7	13	65	16	81
1—2 weeks ...	2	3	5	7	7	14	150	5	155
2—3 " ...	3	...	3	28	3	31	218	2	220
3—4 " ...	4	...	4	193	...	193	193	3	196
4—5 " ...	2	1	3	349	1	350	172	...	172
5—6 " ...	6	...	6	187	1	188	102	...	102
6—7 " ...	20	...	20	65	...	65	56	1	57
7—8 " ...	9	...	9	34	...	34	50	1	51
8—9 " ...	5	...	5	26	...	26	24	...	24
9—10 " ...	5	...	5	12	...	12	19	...	19
10—11 " ...	8	...	8	9	...	9	14	...	14
11—12 " ...	2	...	2	7	...	7	12	2	14
12—13 " ...	...	...	...	6	...	6	6	...	6
13—14 " ...	1	...	1	3	...	3	5	2	7
14—15 " ...	...	...	...	1	...	1	2	...	2
15—16 " ...	...	...	...	...	...	...	4	...	4
16—17 " ...	...	...	...	1	1	2	5	...	5
17—18 " ...	...	...	...	2	...	2	2	...	2
18—19 " ...	...	...	...	...	2	2	1	...	1
19—20 " ...	...	...	...	2	...	2	2	...	2
20—21 " ...	1	...	1	...	...	...	2	...	2
21—22 " ...	...	...	...	4	...	4	1	...	1
22—23 " ...	1	...	1	...	...	...	2	...	2
23—24 " ...	...	...	...	1	...	1	1	...	1
24—25 " ...	...	...	...	1	...	1	1	...	1
25—26 " ...	...	...	...	...	...	...	2	...	2
26—27 " ...	...	...	...	...	...	...	3	...	3
27—28 " ...	...	...	...	1	...	1	1	...	1
28—29 " ...	...	...	...	1	...	1	2	...	2
29—30 " ...	...	...	...	...	...	...	...	...	...
30—31 " ...	...	...	...	...	...	...	...	...	...
Total ...	...	...	...	946	22	968	1,117	32	1,149

TABLE VIII.—Fortnightly Admissions of cases of Typhoid Fever, Scarlet Fever, Diphtheria, and Measles, 1916.

	Fortnight ending—																												Total.
	Jan.		Feb.		March.		April.		May.		June.		July.		August.		Sept.		Oct.		Nov.		December.						
	14	28	11	25	10	24	7	21	5	19	2	16	30	14	28	11	25	8	22	6	20	3	17	1	15	29	31		
Typhoid Fever	4	8	10	5	6	5	4	4	2	2	...	1	1	2	1	2	1	...	...	...	...	...	...	...	...	1	...	59
Scarlet Fever	56	50	50	40	18	35	37	39	28	41	32	36	24	39	33	40	32	40	23	28	39	38	17	13	3	1	3	835	
Diphtheria	43	29	42	48	90	77	67	74	63	73	60	42	40	36	36	31	43	55	37	20	26	13	11	26	15	4	...	1,101	
Measles	9	5	7	4	2	5	4	5	15	9	6	5	10	6	7	8	21	13	12	19	9	7	9	8	2	1	...	206	

TABLE IX.—Return of the Number of Persons under Treatment, the Order of Disease for which they were treated, and the Number of Deaths in each Order during the year 1916. (Includes cases remaining in Hospital on 31st December, 1916.)

	Discharged during the year.				Remaining in on 31st December, 1916.	Total.
	Cured.	Relieved.	Un- relieved.	Died.		
CLASS I.—GENERAL DISEASES.						
Typhoid Fever	71	...	...	8	4	83
Malaria.....	...	2	...	...	...	2
Smallpox	22	...	...	...	...	22
Measles.....	205	2	...	1	17	225
Scarlet Fever.....	937	8	1	22	108	1,076
Whooping-cough	29	3	...	9	12	53
Diphtheria	1,103	14	...	32	50	1,199
Influenza	35	...	...	...	...	35
Leprosy .....	...	...	3	...	3	6
Tetanus	3	...	...	...	...	3
Erysipelas	43	3	1	1	7	55
Mumps and Other Epidemic Diseases	228	2	...	...	17	247
Purulent Infection and Septicæmia .....	...	...	...	...	...	...
Sarcoma of Thigh .....	...	...	...	...	...	...
Carcinoma of Uterus .....	...	...	...	...	...	...
Beriberi	1	...	...	...	...	1
Epithelioma of Hand, &c. ....	...	...	...	...	...	...
Anthrax	1	...	...	1	...	2
Tuberculosis of the Lungs.....	1	8	1	3	2	15
Tubercular Meningitis .....	...	...	...	2	...	2
Pott's Disease .....	...	3	...	...	2	5
Tubercular Disease of Bone .....	...	...	...	...	...	...
Tuberculosis of other organs	5	10	2	2	10	29
Total	2,684	55	8	81	232	3,060

TABLE IX.—Return of the Number of Persons under Treatment, &c.—*continued*.

	Discharged during the year.				Remaining in on 31st December, 1916.	Total.
	Cured.	Relieved.	Un- relieved.	Died.		
CLASS 1.—GENERAL DISEASES—continued.						
Morphia Habit .....	...	...	...	...	...	...
White Swellings.....	...	...	...	...	...	...
General Tuberculosis.....	2	2	...	...	...	4
Chloroma .....	...	...	...	...	...	...
Syphilis—						
Primary	1	36	...	...	2	39
Secondary	3	137	2	...	7	149
Tertiary .....	...	36	1	2	6	45
Hereditary .....	...	2	...	...	...	2
Period not stated .....	...	1	1	...	...	2
Soft Chancre	1	...	...	...	...	1
Gonorrhœal Diseases.....	51	129	3	...	18	201
Cancer, &c., of the Mouth	2	3	3	...	...	8
Cancer, &c., of the Stomach and Liver .....	...	4	4	2	2	12
Cancer, &c., of the Peritoneum, the Intestines, and the Rectum.....	...	1	1	1	1	4
Cancer, &c., of the Female Genital Organs.....	...	...	...	1	2	3
Cancer, &c., of the Breast	3	3	1	1	1	9
Cancer of Skin	3	3	...	1	...	7
Cancer, &c., of other Organs	5	1	1	2	...	9
Other Tumours	4	3	...	1	...	8
Acute Rheumatism	20	11	...	1	5	37
Chronic Rheumatism and Gout	6	18	2	1	...	27
Diabetes .....	...	...	...	...	...	...
Exophthalmic Goitre	2	3	...	...	...	5
Cerebral Tumours.....	...	...	...	...	...	...
Anæmia, Chlorosis .....	...	2	...	2	2	6
Fibroma of Leg, &c. ....	...	...	...	...	...	...
Ptomaine Poisoning .....	...	...	...	...	...	...
Other Chronic Poisoning.....	...	...	1	...	...	1
Other General Diseases.....	3	...	...	1	...	4
Alcoholism, Acute and Chronic.....	7	10	...	1	1	19
Total, Class 1	2,797	450	28	98	279	3,662
CLASS 2.—DISEASES OF THE NERVOUS SYSTEM AND OF THE ORGANS OF SPECIAL SENSE.						
Cerebro Spinal Meningitis	4	...	...	5	1	10
Other Diseases of the Spinal Cord .....	...	3	...	1	1	5
Cerebral Hæmorrhage.....	1	5	...	2	...	8
Paralysis without indicated cause .....	...	...	1	1	...	2
Other forms of Mental Alienation, Meningitis .....	...	...	...	...	1	1
Epilepsy	1	2	...	...	1	4
Convulsions	1	...	...	...	...	1
Chorea.....	1	...	...	...	1	2
Locomotor Ataxia.....	...	4	1	...	...	5
Neuralgia and Neuritis.....	13	5	...	...	3	21
Other diseases of the Nervous System.....	2	9	2	1	2	16
Disease of the ear	3	3	1	...	...	7
Diseases of the Eye and Adnexa	7	...	...	...	...	7
Total, Class 2	33	31	5	10	10	89
CLASS 3.—DISEASES OF THE CIRCULATORY SYSTEM.						
Acute Endocarditis	3	1	...	1	1	6
Aneurism	1	...	...	...	...	1
Organic Diseases of the Heart.....	2	9	1	14	3	29
Diseases of the Arteries, Atheroma, &c.....	...	3	1	1	1	6
Embolism and Thrombosis	1	...	...	...	...	1
Angina Pectoris .....	...	...	...	1	...	1
Diseases of the Veins (Varices, Varicose Ulcer, Hæmorrhoids)	118	3	3	...	4	123
Diseases of the Lymphatic System.....	5	...	...	...	2	7
Hæmorrhage	1	1	...	...	...	2
Total, Class 3	131	17	5	17	11	181
CLASS 4.—DISEASES OF THE RESPIRATORY SYSTEM.						
Diseases of the Nasal Fossæ	3	...	...	...	...	3
Goitre	1	...	...	...	...	1
Diseases of the Larynx	1	...	...	...	...	1
Diseases of the Thyroid Body.....	...	...	...	...	...	...
Acute Bronchitis	16	1	...	...	2	19
Chronic Bronchitis	6	2	...	1	...	9
Broncho-Pneumonia	27	...	...	6	...	33
Pneumonia	25	2	...	8	1	36
Pleurisy.....	4	1	...	1	2	8
Rhinitis .....	...	...	...	...	...	...
Asthma .....	...	6	...	...	...	6
Other Diseases of Respiratory System	4	2	...	...	...	6
Total, Class 4	87	14	...	16	5	122

TABLE IX.—Return of the Number of Persons under Treatment, &c.—*continued*.

	Discharged during the year.				Remaining in on 31st December, 1916.	Total.
	Cured.	Relieved.	Un- relieved.	Died.		

CLASS 5.—DISEASES OF THE DIGESTIVE SYSTEM.

Diseases of the Teeth and Gums.....	1	.....	.....	.....	.....	1
Diseases of the Mouth and its associated organs.....	15	1	.....	.....	1	17
Diseases of the Pharynx	118	2	.....	.....	2	122
Ulcer of the Stomach	3	.....	.....	2	3	8
Other Diseases of the Stomach (Cancer excluded)	4	2	.....	.....	2	8
Diseases of (Esophagus)	2	.....	.....	.....	.....	2
Diarrhœa and Enteritis (children under two years of age only).....	5	2	.....	5	2	14
Diarrhœa and Enteritis (children over two years and adults).....	14	1	.....	2	5	22
Intestinal parasites .....	.....	.....	.....	.....	.....	.....
Appendicitis	34	3	.....	.....	4	41
Hernia, Intestinal Obstruction	92	1	1	.....	2	96
Other Diseases of the Intestines	4	1	.....	1	.....	6
Diseases of the Anus and Fæcal Fistulæ	12	2	.....	.....	3	17
Gastritis	10	3	.....	.....	.....	13
Cirrhosis of the Liver .....	.....	.....	.....	1	.....	1
Biliary Calculi.....	3	1	.....	.....	.....	4
Other Diseases of the Liver.....	2	3	1	.....	.....	6
Simple Peritonitis (non-puerperal)	1	1	.....	.....	.....	2
Hydatid (Undefined).....	1	.....	1	.....	1	3
Other Diseases of Digestive System	7	.....	.....	.....	.....	7
Total, Class 5	328	23	3	11	25	390

CLASS 6.—DISEASES OF THE GENITO-URINARY SYSTEM AND ADNEXA.

Acute Nephritis .....	.....	.....	.....	1	.....	1
Bright's Disease	1	9	1	2	1	14
Prolapsus Uteri.....	2	.....	.....	.....	1	3
Other Diseases of the Kidneys and their Adnexa.	2	5	.....	1	1	9
Calculi of the Urinary Passages	1	.....	.....	.....	1	2
Diseases of the Bladder.....	10	2	.....	.....	.....	12
Other Diseases of the Urethra, Urinary Abscess, &c.....	4	7	.....	.....	.....	11
Diseases of the Prostate	1	2	.....	.....	2	5
Non-venereal Diseases of the Male Genital Organs	12	.....	.....	.....	1	13
Metritis	5	1	.....	.....	.....	6
Uterine Hæmorrhage (non-puerperal).....	2	.....	.....	.....	.....	2
Uterine Tumour (non-cancerous).....	6	.....	.....	1	.....	7
Other Diseases of the Uterus	15	4	.....	1	4	24
Cysts and other Ovarian Tumours	4	.....	1	.....	.....	5
Other Diseases of the Female Genital Organs	14	8	.....	1	.....	23
Non-puerperal Diseases of the Breast (Cancer excepted)	1	.....	.....	.....	.....	1
Total, Class 6	80	38	2	7	11	138

CLASS 7.—PUERPERAL CONDITIONS.

Accidents of Pregnancy	38	1	.....	.....	1	40
Other Accidents of Childbirth.....	2	.....	.....	.....	.....	2
Puerperal Septicæmia	2	.....	2	7	.....	11
Puerperal Phlegmasia alba dolens	1	.....	.....	.....	.....	1
Subinvolution of Uterus.....	.....	.....	.....	.....	.....	.....
Puerperal Albuminuria Convulsions.....	2	.....	.....	.....	.....	2
Thrombosis of Leg .....	.....	.....	.....	.....	.....	.....
Puerperal Hæmorrhage .....	.....	.....	.....	.....	.....	.....
Following Childbirth not defined.....	1	.....	.....	1	.....	2
Total, Class 7	46	1	2	8	1	58

CLASS 8.—DISEASES OF THE SKIN AND OF THE CELLULAR TISSUE.

Gangrene.....	.....	.....	.....	1	.....	1
Carbuncle	8	1	.....	.....	.....	9
Phlegmon, Acute Abscess.....	28	4	1	1	4	38
Other Diseases of the Skin and Adnexa	35	14	1	.....	4	54
Scabies	2	.....	.....	.....	.....	2
T.B. Sinus of R. Groin .....	.....	.....	.....	.....	.....	.....
Elephantiasis.....	.....	.....	.....	.....	.....	.....
Total, Class 8	73	19	2	2	8	104

TABLE IX.—Return of the Number of Persons under Treatment &c.—*continued*.

	Discharged during the year.				Remaining in on 31st December, 1916.	Total.
	Cured.	Relieved.	Un- relieved.	Died.		
CLASS 9.—DISEASES OF THE ORGANS OF LOCOMOTION.						
Non-tuberculous Diseases of the Bones.....	5	11	.....	.....	1	17
Arthritis and other Diseases of the Joints (Tuberculosis and Rheumatism excepted)	5	6	1	.....	2	14
Other Diseases of the Organs of Locomotion...	4	1	.....	.....	.....	5
Amputation.....	3	2	.....	.....	2	7
Total, Class 9	17	20	1	.....	5	43
CLASS 10.—MALFORMATION.						
Congenital Malformation.....	11	4	3	.....	.....	18
Total, Class 10	11	4	3	.....	.....	18
CLASS 11.—INFANCY.						
Newly-born Infants leaving Hospital, &c., without having been ill .....	.....	.....	.....	.....	.....	.....
Congenital Debility of Children .....	.....	.....	.....	1	.....	1
Other Diseases Peculiar to Early Infancy ....	.....	1	.....	.....	.....	1
Neglect.....	1	.....	.....	.....	.....	1
Total, Class 11	1	1	.....	1	.....	3
CLASS 12.—OLD AGE.						
Senile Debility	1	19	.....	1	.....	21
Total, Class 12	1	19	.....	1	.....	21
CLASS 13.—VIOLENCE.						
Scalds .....	.....	1	.....	.....	1	2
Acute Poisoning.....	1	.....	.....	.....	.....	1
Poisoning by Food (not Potomaine)	2	.....	.....	.....	.....	2
Bite of Snake or Insect .....	.....	.....	.....	.....	.....	.....
Firearms Accidents ..	1	.....	.....	.....	.....	1
Cutting Instruments	1	1	1	.....	.....	3
Burning by Fire.....	3	1	.....	.....	.....	4
Falls.....	11	.....	.....	.....	2	13
Machines.....	.....	.....	.....	.....	.....	.....
Railways and Tramways.....	2	.....	.....	.....	2	4
Injury by Vehicles and Horses	1	1	.....	.....	.....	2
Injuries by Animals .....	.....	.....	.....	.....	.....	.....
Starvation .....	.....	.....	.....	.....	.....	.....
Other injuries	1	1	.....	.....	.....	2
Fractures	5	3	1	.....	5	14
Dislocations.....	.....	.....	.....	.....	.....	.....
Sprains	4	1	.....	.....	1	6
Total, Class 13	32	9	2	.....	11	54
CLASS 14.—ILL-DEFINED DISEASES.						
Ill-defined Organic Diseases	1	.....	.....	.....	4	5
Unspecified or ill-defined Causes	5	1	.....	.....	3	9
Debility.....	12	44	.....	.....	57	113
No Disease.....	31	.....	.....	.....	1	32
Total, Class 14	49	45	.....	.....	65	159
SUMMARY.						
Total, Class 1.—General Diseases	2,797	460	28	98	279	3,662
„ 2.—Diseases of the Nervous System and of the Organs of Special Sense	33	31	5	10	10	89
„ 3.—Diseases of the Circulatory System	131	17	5	17	11	181
„ 4.—Diseases of the Respiratory System	87	14	.....	16	5	122
„ 5.—Diseases of the Digestive Organs	323	23	3	11	25	390
„ 6.—Diseases of the Genito-Urin- ary System and Adnexa.....	80	38	2	7	11	138
„ 7.—Puerperal Condition	46	1	2	8	1	58
„ 8.—Diseases of the Skin and of the Cellular Tissue.....	73	19	2	2	8	104
„ 9.—Diseases of the Organs of Locomotion	17	20	1	.....	5	43
„ 10.—Malformation.....	11	4	3	.....	.....	18
„ 11.—Infancy	1	1	.....	1	.....	3
„ 12.—Old Age	1	19	.....	1	.....	21
„ 13.—Violence	32	9	2	.....	11	54
„ 14.—Ill-defined Diseases	49	45	.....	.....	65	159
Grand Total	3,686	701	53	171	431	5,042

TABLE X.—Operations performed during 1916.

	Recovered.		Died.		Total.
	Male.	Female.	Male.	Female.	
I.—Alimentary System.					
Colotomy	2	2	.....	.....	4
Hernia, Inguinal	66	1	.....	.....	67
„ Ineisional	3	1	.....	.....	4
„ Strangulated	1	.....	.....	.....	1
„ Umbilical	1	.....	.....	.....	1
Separation of peri-gastric adhesions .....	.....	1	.....	.....	1
Appendicectomy.....	13	19	.....	.....	32
Fistula in ano	5	3	.....	.....	8
Hare-lip	1	1	.....	.....	2
Cleft palate	1	1	.....	.....	2
Ischio-rectal abscess	2	.....	.....	.....	2
Sigmoidoscopic examination	1	.....	.....	.....	1
Separation adhesion of bowel .....	.....	1	.....	.....	1
Gastroenterostomy.....	3	.....	.....	.....	3
Excision tissue from rectum.....	1	.....	.....	.....	1
Laparotomy	3	3	.....	3	9
Enterorrhaphy .....	.....	1	1	.....	2
Jejunostomy	1	.....	.....	.....	1
Cholecystectomy.....	.....	3	.....	.....	3
Ranula .....	.....	1	.....	.....	1
Closing fœcal fistula	3	.....	.....	.....	3
	107	38	1	3	149
II.—Genito-Urinary System.					
Circumcision	20	.....	.....	.....	20
Hydrocele	6	.....	.....	.....	6
Dorsal slit prepuce	21	.....	.....	.....	21
Catheterisation	1	.....	.....	.....	1
External urethrotomy	1	.....	.....	.....	1
Prostatectomy	1	.....	.....	.....	1
Peri-urethral abscess	1	.....	.....	.....	1
Removal of testicles	3	.....	.....	.....	3
Suprapubic cystotomy	2	.....	.....	.....	2
Prostatic abscess	1	.....	.....	.....	1
	60	.....	.....	.....	60
III.—Cellular and Cutaneous System.					
Incising abscess	14	5	1	.....	20
Stitching lacerated tongue .....	.....	1	.....	.....	1
Incising cellulitis of hand	2	1	1	.....	4
„ „ arm	3	.....	.....	.....	3
„ „ neck	1	.....	.....	.....	1
Excision sebaceous cyst	2	.....	.....	.....	2
Excising malignant pustule	1	.....	.....	.....	1
„ granuloma of arm .....	.....	1	.....	.....	1
	23	8	2	.....	33
IV.—Reproductive System.					
Curette .....	.....	28	.....	.....	28
Caeleotomy .....	.....	9	.....	.....	9
Vaginal examination .....	.....	15	.....	.....	15
Arresting uterine hæmorrhage .....	.....	1	.....	.....	1
Packing cervix uteri .....	.....	1	.....	.....	1
Posterior colporrhaphy .....	.....	1	.....	.....	1
Removal of pelvic hæmatocele .....	.....	1	.....	.....	1
Ventral suspension .....	.....	1	.....	.....	1
Alexander's operation .....	.....	1	.....	.....	1
Amputation cervix uteri .....	.....	1	.....	.....	1
Swabbing cervix .....	.....	1	.....	.....	1
	.....	60	.....	.....	60
V.—Osseous and Arthritic System.					
Trephining skull .....	.....	2	.....	.....	2
Radical mastoid	6	4	.....	.....	10
Sequestrectomy	4	1	.....	.....	5
Curetting sinus	5	3	.....	.....	8
Tenotomy	5	1	.....	.....	6
Application of extension	1	.....	.....	.....	1
Tenosectomy	2	1	.....	.....	3
Reducing dislocation	1	2	.....	.....	3
Exploring fracture of skull	1	.....	.....	.....	1
„ joint .....	.....	1	.....	.....	1
Amputation of leg	3	1	.....	.....	4
„ arm	2	.....	.....	.....	2
„ toe	3	.....	.....	.....	3
„ finger	4	.....	.....	.....	4

NOTE.—“ Recovered ” means lived 10 days or more after operation.

TABLE X.—Operations performed during 1916—*continued*.

	Recovered.		Died.		Total.
	Male.	Female.	Male.	Female.	
V.—Osseous and Arthritic System—continued.					
Arthrotomy	4	.....	.....	.....	4
Excision semilunar cartilage	1	.....	.....	.....	1
Osteotomy	2	2	.....	.....	4
Probing joint	4	1	.....	.....	5
Setting fracture	5	.....	.....	.....	5
Excision of coccyx	1	.....	.....	.....	1
Correcting talipes	2	.....	.....	.....	2
Incising prepatella, bursa .....	.....	2	.....	.....	2
Suturing tendons of fingers	1	.....	.....	.....	1
Wiring fracture	1	.....	.....	.....	1
Arthroplasty.....	1	.....	.....	.....	1
Excision of Spine of os calcis	1	.....	.....	.....	1
	60	21	.....	.....	81
VI.—Respiratory System.					
Tonsil and adenoids	7	7	.....	.....	14
Adenoids	12	3	.....	.....	15
Tonsil	2	2	.....	.....	4
Tracheotomy .....	.....	.....	2	1	3
Empyema	4	1	.....	1	6
Exploring chest .....	.....	2	.....	.....	2
	25	15	2	2	44
VII.—Circulatory System.					
Varicocele	42	.....	.....	.....	42
Varicose veins	24	4	.....	.....	28
Hæmorrhoids	19	1	.....	.....	20
Ligature of artery	2	.....	.....	.....	2
Injection of Salvarsan .....	.....	1	.....	.....	1
	87	6	.....	.....	93
VIII.—Lymphatic System.					
Excising glands of neck	3	.....	.....	.....	3
„ T.B. glands and neck .....	.....	1	.....	.....	1
	3	1	.....	.....	4
IX.—New Growths (Glands).					
Tumour of breast	1	1	.....	.....	2
„ pouparts ligament .....	.....	1	.....	.....	1
„ parotid .....	.....	1	.....	.....	1
„ humerus	1	.....	.....	.....	1
„ tendo achillis .....	.....	1	.....	.....	1
„ testicles	1	.....	.....	.....	1
„ jaw	2	.....	.....	.....	2
„ hand	1	.....	.....	.....	1
„ neck	1	.....	.....	.....	1
„ sternum	1	.....	.....	.....	1
Cancer of ear	2	.....	.....	.....	2
„ cheek	1	.....	.....	.....	1
Sarcoma of axilla .....	.....	1	.....	.....	1
„ palate	1	.....	.....	.....	1
Exploring tumour of face	1	.....	.....	.....	1
Excision, sub-maxillary	1	.....	.....	.....	1
Epithelioma of leg	1	.....	.....	.....	1
Hyiod. cyst	1	.....	.....	.....	1
Rodent ulcer	1	.....	.....	.....	1
	17	5	.....	.....	22
X.—Miscellaneous.					
Dressing wound	4	8	.....	.....	12
Examination of mouth	1	.....	.....	.....	1
Excision of ingrowing toenail	1	.....	.....	.....	1
Tooth extraction	2	5	.....	.....	7
Paracentesis abdomus	1	.....	.....	.....	1
Excising fish-hook	1	.....	.....	.....	1
Lumbar punctures	40	26	2	1	69
Thyroidectomy	1	4	.....	.....	5
Suturing wounds	1	1	.....	.....	2
Plastic on finger .....	.....	1	.....	.....	1
Obstetrical anæsthesia at childbirth .....	.....	2	.....	.....	2
Canterisation	1	.....	.....	.....	1
Avulsion of toe-nail	1	.....	.....	.....	1
Removal of sutures .....	.....	1	.....	.....	1
	54	48	2	1	105

TABLE X.—Operations performed during 1916—*continued*.

	Recovered.		Died.		Total.
	Male.	Female.	Male.	Female.	
XI.—Dual Operations.					
Removal of tumour, breast and face	1	.....	.....	.....	1
Double inguinal hernia	2	.....	.....	.....	2
Salpingo oöphorectomy and appendicectomy.....	.....	2	.....	.....	2
Inguinal hernia and varicose veins	2	.....	.....	.....	2
Double hydrocele	1	.....	.....	.....	1
Varicocele and circumcision	1	.....	.....	.....	1
Inguinal hernia and appendicectomy	2	.....	.....	.....	2
Circumcision and removal of adenoids	1	.....	.....	.....	1
Inguinal hernia and orchidectomy	1	.....	.....	.....	1
Circumcision and hæmorrhoids	1	.....	.....	.....	1
Curette, subtotal hysterectomy, double salpingectomy and appendicectomy .....	.....	1	.....	.....	1
Varicocele, hydrocele	1	.....	.....	.....	1
Hernia and teeth extraction.....	1	.....	.....	.....	1
Curette and trachelorrhaphy .....	.....	1	.....	.....	1
Adnoma of parotid epithelioma of neck, sebaceous cyst of eyelid	1	.....	.....	.....	1
Appendicectomy, cyst of ovaries and adhesions, Alexan- der's operation .....	.....	1	.....	.....	1
Double salpingectomy and internal shortening .....	.....	1	.....	.....	1
Enterorrhaphy and appendicectomy.....	1	.....	.....	.....	1
Perisigmoid adhesions and appendicectomy .....	.....	1	.....	.....	1
Tenotomy and tarsectomy .....	.....	1	.....	.....	1
Salpingectomy and cyst of ovaries .....	.....	1	.....	.....	1
Curette and Alexander's operation .....	.....	1	.....	.....	1
P.rineorrhaphy, anterior and posterior colporrhaphy, and Alexander's operation .....	.....	1	.....	.....	1
Hernia and hydrocele	1	.....	.....	.....	1
Amputation of toe and tenotomy	1	.....	.....	.....	1
" " varicose veins	1	.....	.....	.....	1
Curette, internal shortening, and appendicectomy .....	.....	1	.....	.....	1
Hysterectomy and appendicectomy .....	.....	1	.....	.....	1
Varicocele and hæmorrhoids	2	.....	.....	.....	2
Appendicectomy, ovarian cyst, and separation of peri- sigmoid adhesions .....	.....	2	.....	.....	2
Ovarian cysts and appendicectomy .....	.....	1	.....	.....	1
Varicocele and varicose veins	1	.....	.....	.....	1
Curette, salpingo-oöphorectomy, and separation sigmoid adhesions .....	.....	1	.....	.....	1
Subtotal hysterectomy, appendicectomy, double salping- ectomy, and right oöphorectomy.....	.....	1	.....	.....	1
Interorrhaphy and gastroenterostomy .....	.....	.....	.....	1	1
Vaginal and sigmoidoscopic examination .....	.....	1	.....	.....	1
Enucleation of fibroid and appendicectomy.....	.....	1	.....	.....	1
Excision of parotid ascending ramus of lower jaw and gland of neck	1	.....	.....	.....	1
Fistula in ano and excision of hæmorrhoids .....	.....	1	.....	.....	1
Hernia and hæmorrhoids	1	.....	.....	.....	1
Hæmorrhoids and varicose veins	1	.....	.....	.....	1
Appendicectomy, double salpingo-oöphorectomy, sub- total hysterectomy, curette .....	.....	1	.....	.....	1
Salpingo-oöphorectomy, appendicectomy, separation of perisigmoid adhesions .....	.....	1	.....	.....	1
Curette, salpingo-oöphorectomy, and appendicectomy...	.....	1	.....	.....	1
Curette, trachelorrhaphy, and colpoperineorrhaphy.....	.....	1	.....	.....	1
Anterior and posterior colporrhaphy.....	.....	1	.....	.....	1
Partial excision of lower jaw, tongue, and glands of neck	1	.....	.....	.....	1
Double oöphorectomy .....	.....	1	.....	.....	1
Curette, salpingo-oöphorectomy, excision cyst of ovary	.....	1	.....	.....	1
Excision of epithelioma of lip and glands of neck.....	2	.....	.....	.....	2
" " and plastic on cheek	1	.....	.....	.....	1
Amputation of cervix and hæmorrhoids .....	.....	1	.....	.....	1
Appendicectomy and internal shortening	3	.....	.....	.....	3
" " papillomata of face .....	.....	1	.....	.....	1
Salpingectomy and ventral suspension .....	.....	1	.....	.....	1
Double salpingo-oöphorectomy and appendicectomy ...	.....	1	.....	.....	1
Panhysterectomy, appendicectomy, and teeth extrac- tion .....	.....	1	.....	.....	1
Radical cure, inguinal hernia, and tenotomy for hammer toe	1	.....	.....	.....	1
Excision of callus and removing plate from tibia	1	.....	.....	.....	1
Curette, appendicectomy, excision of cyst of ovaries, and internal shortening.....	.....	1	.....	.....	1
Excision of hydatid cyst and lipoma .....	.....	1	.....	.....	1
Gastroenterostomy, avulsion of toe-nail, and teeth extraction .....	.....	1	.....	.....	1
Excision of tumour of thigh and inguinal glands.....	.....	1	.....	.....	1
Hernia and varicocele	1	.....	.....	.....	1
Incising abscess of leg and draining antrum of highmore	1	.....	.....	.....	1
Hæmorrhoids and peri-rectal abscess	1	.....	.....	.....	1
Appendicectomy and salpingo-oöphorectomy .....	.....	1	.....	.....	1
Excision of tumour of uterus and separation of adhesions internal shortening.....	.....	1	.....	.....	1
	37	39	.....	1	77

TABLE X.—Operations performed during 1916—*continued*.

<i>Anæsthetic Used.</i>	
Ether	491
Chloroform and ether	77
Chloroform	18
Kelene and ether	54
Kelene	49
Cocaine	3
Cocaine and adrenalin	24
Beta, eucaine, and adrenalin	15
Stovaine	1
Total	732

TABLE XI.—Statement of Working Expenses of the Coast Hospital for the year 1916.

MAINTENANCE AND TREATMENT OF PATIENTS AND STAFF.

	1916.	
	Amount.	Average.
	£ s. d.	£ s. d.
A. Salaries and Wages—		
1. Administrative	872 8 0	
2. Medical	1,798 2 6	
3. Clerical	709 6 8	
4. Dispensary	203 11 8	
5. Nursing	7,111 17 3	
9. Laundry	623 8 8	
10. Tradesman and Mechanics	1,729 12 5	
11. Cleaning and General	2,434 3 1	
12. Farm and Garden	245 18 4	
	15,728 8 7	35 3 9
B. Provisions—		
1. Meat	3,362 3 0	
2. Milk	1,489 18 0	
3. Butter	1,024 6 3	
5. Bread and Flour	945 1 9	
6. Eggs	607 10 6	
7. Fish, Fresh	721 0 4	
8. Poultry	224 19 6	
9. Groceries	2,882 13 3	
10. Vegetables and Fruit	834 13 3	
11. Malt Liquors		
12. Ice	85 3 2	
	12,177 9 0	27 4 10
C. Drugs and Surgical Appliances—		
1. Drugs, &c.	2,200 4 6	
2. Dressings and Bandages	39 8 5	
3. Surgical Appliances, Renewals	315 1 11	
4. Surgical Instruments, Renewals		
5. Stimulants	79 7 5	
	2,634 2 3	5 17 10
D. Fuel, Light, and Power—		
1. Coal, Coke, and Wood	1,827 3 7	
4. Electricity.....	293 3 2	
5. Electrical Fittings, Renewals	72 7 6	
	2,192 14 3	4 18 1
E. Domestic—		
1. Bedding and Bed Linen	220 17 6	
2. Clothing	134 2 4	
3. Drapery.....	448 1 7	
4. Uniforms	122 8 3	
5. Renewals of Furniture	9 17 0	
6. Ironmongery, Cutlery, &c.	190 8 6	
7. Brushware, Earthenware, &c.	94 10 6	
8. Laundry Materials		
	1,220 5 8	2 14 7
F. Printing and Stationery—		
1. Printing and Stationery	39 4 6	
3. Postage	23 15 0	
	62 19 6	0 2 10
G. Maintenance of Buildings and Grounds—		
1. Ordinary Repairs and Alterations	1,097 16 6	
2. Roadways and Grounds		
	1,097 16 6	2 9 2

TABLE XI.—Statement of the Working Expenses of the Coast Hospital—*continued*.

	1916.	
	Amount.	Average.
	£ s. d.	£ s. d.
J. Miscellaneous—		
1. Rates and Taxes	88 14 11	
2. Insurance	119 13 2	
3. Burials and Coffins	10 4 9	
4. Telephones	1 4 11	
7. Petty Expenses	142 8 1	
8. Unclassified	197 5 11	
Gratuities	411 5 5	
	970 17 2	2 3 5
K. Extraordinary Expenditure—		
1. Surgical Instruments		
2. Appliances	5 0 0	
3. Machinery	4 17 0	
4. New Furniture	7 3 6	
5. New Buildings and Additions		
	17 0 6	0 0 9
Farm and Garden, Live Stock, &c.—		
Purchase of Horses and Cows.....	278 0 0	
Purchase of Fodder	477 13 11	
	755 13 11	1 13 10
	£ s. d.	
	36,857 7 4	
Add value of goods received from other Institutions	22 18 4	
	36,880 5 8	36,857 7 4 82 9 1
Deduct value of goods supplied to other Institutions		
	36,880 5 8	
Add value of Stock on hand, 31st December, 1915	1,901 13 8	
	38,781 19 4	
Deduct value of Stock on hand, 31st Dec., 1916	2,781 1 2	
	36,000 18 2	
Deduct Collections paid to Revenue	1,470 19 9	
	£34,529 18 5	2,327 8 11 5 4 2
Total cost	34,529 18 5	
Cost per occupied bed		77 4 11

NOTE.—Less deduction for sixty working patients at £30 10s. per head per annum, the net cost per hospital bed would be £84 9s. 11d. per year.

TABLE XII.—Amount expended from the vote of the Public Works Department, not included in the foregoing statistics :—

	£ s. d.	£ s. d.
New Hospital Units—Coast Hospital		19,592 4 5
Alterations, repairs, &c.—		
Boilers and cooking services	165 4 6	
Buildings, fences, &c.	192 10 3	
Electric lighting services	104 12 9	
Water and sewerage services	90 11 11	
Telephonettes	4 0 2	
		556 19 7
		£20,149 4 0

TABLE

2.—LEPER LAZARET.

TWENTY-SIXTH REPORT ON LEPROSY IN NEW SOUTH WALES, FOR THE YEAR
ENDED 31st DECEMBER, 1916.

The Medical Superintendent of the Coast Hospital to the Director-General of Public Health.

The Coast Hospital, Sydney, N.S.W., 1917.

Sir,

On 1st January, 1916, 22 persons remained under detention at the lazaret.
[See Appendix A.]

During the year 5 persons were reported to the Board under the Public Health Act, 1902, Part 3, as being suspected lepers, and after careful inquiry were duly certified as suffering from leprosy, and admitted to the lazaret by warrant of the Board.

One death occurred during the year, viz. :—

F.H., a Chinaman, admitted in 1916. Case CXLII.

One discharge occurred during the year, viz. :—

L.J.T., N.S.W., admitted in 1912. Case CXXIX.

From the Summary column of Appendix A it will be seen that the total number of persons admitted since 1883, when patients first began to be received (though the notification of leprosy was first made compulsory and the detention of lepers provided for by law only towards the end of 1890), is 142.* Distributed under nationalities, the account stands as follows :—

	Admitted.	Died.	Discharged.	Repatriated.	Remaining in at 31 Dec., 1916.
Whites, of European descent—					
New South Wales	37	21	7	.....	9
Victoria	1	.....	.....	.....	1
Queensland	1	1	.....	.....	.....
New Zealand	1	1	.....	.....	.....
Fiji	2	1	.....	.....	1
England	11	6	2	.....	3
Ireland	5	4	1	.....	.....
Germany	2	2	.....	.....	.....
Belgium	1	1	.....	.....	.....
Greece	1	.....	.....	1	.....
U.S. America	1	1	.....	.....	.....
Coloured patients—					
China	52	17	.....	32	3
India	3	2	1 (absconded)	.....	.....
West Indies	1	.....	1 (in 1885).	.....	.....
Java	1	.....	.....	.....	1
Pacific Islands	17	7	.....	4	6
New Caledonia	1	1	.....	.....	.....
Zanzibar	1	.....	1 (To Hong Kong at own request.)	.....	.....
Egypt	1	.....	.....	1	.....
Syria.....	2	.....	.....	1	1
	142	65	13	39	25

* This is the number of persons admitted; it does not agree with the highest number given in Appendix B in Roman numerals, which indicates the number of cases observed, whether admitted or merely described and recorded.

Thus the number remaining in the lazaret on 31st December, 1916, was 25 persons.

Appendix B shows particulars of each case under detention since the year 1883, and in Appendix C are given the usual notes of the new patients received during the year under review.

Every opportunity has been offered to members of the medical profession to visit the lazaret for the purpose of seeing such patients as were formerly under their care, or for study of the disease.

The following statements show the expenditure for the year, and the sources from which it has been defrayed :—

STATEMENT showing the Working Expenses of the Lazarets (for men and for women) at Little Bay for the year 1916.

	£	s.	d.
Salaries	970	17	3
Provisions	1,050	10	1
Fruits and vegetables.....	111	10	11
Uniforms, clothing, &c.	104	14	2
Printing and stationery	10	5	5
Fuel and light	133	8	3
Repairs	24	10	0
Wines, ale, &c.	48	0	2
Bedding and bed linen	27	6	9
Ironmongery, brushware, &c.	30	12	11
Drugs	38	3	7
Sundries	238	12	9
Total	2,788	12	3

Average number of patients resident, 25·11, being equal to an average of £120 13s. 4d. per inmate per annum.

STATEMENT showing the total Expenditure of the Lazarets (for men and for women) at Little Bay during the year 1916, and from what sources the amounts were paid.

EXPENDITURE.	£	s.	d.	HOW PAID.	£	s.	d.
To working expenses, as per attached statement.	2,788	12	3	From vote—Maintenance of lepers by Department of Public Health	2,324	2	10
				Transfers from Coast Hospital stock	464	9	5
Total	2,788	12	3	Total	2,788	12	3

The needs of the patients have been carefully supplied by experienced attendants and nurses, under direct supervision of myself and the Matron of the Coast Hospital, and, as in the past, every means have been adopted to alleviate their sufferings and to mitigate the hard hips of their detention.

I have, &c.,

D. WALLACE,

Acting-Medical Superintendent.

Natives &c.—	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.	1916.	Summary Total.	
Whites, of European descent.																																					
New South Wales.	Remaining Admitted	.....	.....	.....	.....	.....	.....	1	2	4	8	11	11	10	7	6	8	8	5	5	3	4	7	6	6	5	6	6	5	5	6	7	9	7	..	
	Died	.....	.....	.....	.....	.....	.....	1	1	2	5	2	3	1	...	...	3	1	1	3	2	1	1	1	...	1	...	1	...	1	...	1	...	1	...	37
	Discharged	.....	.....	.....	.....	.....	.....	...	...	1	2	1	...	1	...	...	...	...	...	2	...	...	...	...	...	...	...	1	...	1	...	1	...	1	...	21
Victoria	Remaining Admitted	1	1	1	...	1	...	1	...	1	...	7
	Died	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Queensland	Remaining Admitted	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	1	...	1	...	1	...	...
	Died	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
	Discharged	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
New Zealand ...	Remaining Admitted	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...
	Died	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...
	Discharged	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
Fiji	Remaining Admitted	1	...	1	...	1	1	1	1	1	1	...	1	1	1	1	1	1	1	1	1	1	1	1	1	1	...	2
	Died	.....	.....	.....	.....	.....	.....	.....	.....	.....	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
	Discharged	.....	.....	.....	.....	.....	.....	.....	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
England	Remaining Admitted	1	1	1	1	1	2	2	1	2	...	2	1	2	3	2	1	1	1	1	1	1	1	2	2	...	11
	Died	.....	.....	.....	.....	.....	.....	.....	...	...	...	...	...	...	1	1	...	...	...	...	1	...	1	...	...	...	...	...	1	...	...	...	...	1	...	6
	Discharged	.....	.....																																

* Discharged on the 20th December, 1885, his sores having healed and there being no law warranting his detention. † One patient, I.L., reported 18th December, 1891, was removed to Little Bay on 12th January, 1892. ‡ Readmitted, 19th August, 1907. Repatriated:—a 14th August, 1896; b 17th July, 1897; c 6th August, 1904; d 13th June, 1905; e 23rd June, 1905 f 9th November, 1906; g 9th May, 1908; h 1st December, 1908.

APPENDIX B.

RETURN showing Particulars of Lepers detained at Little Bay, New South Wales, since the year 1883.

Name.	Sex.	Native of—	Occupation.	Admission.		Where from.	No. of Case in Clinical Notes.	Died or Discharged.
				Age on	Date of			
A.H.	Male	China	Gardener	42	19 April, 1883	Parramatta Asylum	.....	Died, 15 May, 1886.
J.H.	"	"	"	32	19 " "	" .....	.....	Died 27 June, 1886.
A.H.	"	"	"	34	12 June, "	" .....	.....	Died, 20 April, 1886.
A.M.	"	"	Butcher	32	28 Oct., "	Tenterfield	XIV	Returned to China, 14 Aug., 1896.
A.P.	"	"	Storekeeper	27	28 " "	Willow Creek	XV	
G.H.	"	"	Labourer	37	27 " 1884	Sydney .....	.....	†Died, 24 Dec., 1886.
K.K.	"	"	"	24	21 Dec., "	Bathurst .....	.....	Died, 28 April, 1885.
J.B.	"	West Indies ..	"	51	22 Sept., 1885	Bermagui .....	.....	†Discharged, 29 Dec., 1885.
A.Y.	"	China	Gardener	29	23 Dec., "	Sydney .....	.....	Died, 6 Feb., 1890.
C.B.	"	"	"	32	29 Jan., 1886	Alexandria	XVI	Returned to China, 14 Aug., 1896.
A.S.	"	"	Tin-miner	42	20 Feb., "	Cooper's Creek .....	.....	Died, 12 Nov., 1890.
C.T.	"	Java	Groom	24	14 Aug., "	Castle Hill, Parramatta.	XVII	
A.L.	"	China	Gardener	44	20 May, 1887	Bathurst .....	.....	Died, 12 April, 1891.
Y.S.	"	"	Carpenter	31	20 April, 1888	Sydney	XVIII	Returned to China, 14 Aug., 1896.
*F.G.	"	N.S.W.	Plasterer	27	21 Aug., "	"	I	Died, 25 Sept., 1892.
A.Y.	"	China	Gardener	29	30 Sept., "	Inverell	XIX	
L.P.	"	"	Carpenter	18	22 Dec., "	Sydney	XX	Returned to China, 14 Aug., 1896.
H.K.	"	"	Miner	28	23 Mar., 1889	Enfield	XXI	
*H.B.	"	N.S.W.	"	17	17 Dec., "	Mudgee	II	Died, 13 May, 1894.
*H.R.	"	"	Labourer	28	8 Aug., 1890	Richmond River ..	III	
*A.G.	"	"	Schoolboy	14	18 " "	Balmain	IV	Discharged, 1 May, 1895.
*E.U.	"	"	Labourer	23	16 Jan., 1891	Sydney	V	
*H.S.	"	"	Mariner	41	23 " "	Newtown	VI	Died, 4 Feb., 1891.
A.L.	"	China	Gardener	30	26 Feb., "	Newcastle	XXIII	
*M.R.	Female	N.S.W.	Domestic duties ..	33	11 Mar., "	Surry Hills	VII	Died, 20 June, 1892.
T.W.	Male	China	Cook	29	6 Aug., "	Narrandera	XXV	
W.C.	"	"	Labourer	40	27 " "	Sydney	XXIV	Returned to China, 14 Aug., 1896.
A.H.	"	"	Storekeeper	25	18 Sept., "	Mudgee	XXII	
J.L.	"	Tanna	Labourer	25	8 Dec., "	Clarence River	XXVI	Died, 7 May, 1901.
*R.W.	"	N.S.W.	Carpenter	47	24 " "	Narrabri	VIII	
*I.L.	Female	"	Domestic duties ..	53	18 " "	Waverley	IX	Died, 16 June, 1899.
A.S.	Male	China	Cabinetmaker	28	21 April, 1892	Sydney	XXVII	
*C.D.	"	N.S.W.	Carpenter	24	30 " "	Gunnedah	X	Died, 17 Aug., 1900.
S.P.	"	England	Commercial traveller	49	7 June, "	Sydney	XI	
H.G.	"	China	Wood-cutter	47	19 Sept., "	"	XXVIII	Returned to China, 14 Aug., 1896.
*M.E.K.	Female	N.S.W.	Domestic duties ..	43	21 " "	North Sydney	XII	Died, 23 July, 1897.
L.P.H.	Male	China	Gardener	44	12 Oct., "	Manly	XXIX	
W.W.	"	Fiji	Schoolboy	13	27 " "	Sydney	XIII	Died, 26 Jan., 1901.
A.L.	"	China	Gardener	35	3 Nov., "	Bombala	XXXI	
A.Q.	"	"	Dealer	39	15 " "	"	XXXII	Returned to China, 14 Aug., 1896.
J.C.	"	"	"	38	29 " "	Sydney	XXXIII	Died, 2 Aug., 1893.
A.G.	"	"	Labourer	26	7 Dec., "	Parramatta	XXX	
G.Y.	"	"	Cook	68	31 " "	Sydney	XXXIV	Returned to China, 14 Aug., 1896.
A.P.	"	"	Hawker	33	21 Jan., 1893	Parramatta	XXXV	
W.M.	Female	New Zealand ..	"	24	27 Feb., "	Fiji	XXXVI	Died, 10 Sept., 1895.
A.T.	Male	China	Bushman	28	15 April, "	Cooma	XXXVII	
*N.G.	"	N.S.W.	Miner	61	21 " "	Parramatta Asylum	XXXVIII	Died, 4 April, 1896.
*A.M.	Female	"	Housewife	35	7 Sept., "	Balmain	XXXIX	
P.M.	Male	India	Hawker	47	3 Nov., "	Newcastle	XL	Died, 22 Mar., 1899.
*E.R.	Female	N.S.W.	Domestic duties ..	16	18 " "	West Maitland	XLI	
C.H.M.	Male	Germany	Station overseer ..	65	25 Jan., 1894	Sydney	XLII	Died, 21 Sept., 1900.
W.H.D.	"	Queensland ..	"	21	18 April, "	"	XLIII	
G.N.	"	New Caledonia ..	Pearl-diver	20	16 July, "	"	XLIV	Died, 1 Sept., 1895.
*H.J.T.	"	N.S.W.	Bushman	52	10 Oct., "	"	XLV	
K.J.	"	India	Hawker	30	30 Nov., "	"	XLVI	Died, 2 Aug., 1895.
J.T.	"	England	Labourer	70	4 April, 1895	Coast Hospital	XLVIII	
T.O'R.	"	Ireland	"	70	2 Oct., "	Sydney	LIII	Died, 6 Nov., 1897.
W.F.	"	"	Clerk	40	8 " "	"	LII	
H.J.	"	China	Hawker	31	21 Jan., 1896	Coast Hospital	LV	Died, 8 Nov., 1895.
H.Y.	"	"	Gardener	26	4 Feb., "	"	LIV	
A.T.	"	"	"	31	25 Dec., "	Oxley	LVI	Returned to China, 14 Aug., 1896.
F.R.	"	Belgium	Mechanic	55	16 Feb., 1897	Coast Hospital	LVIII	Died, 23 June, 1897.
H.W.	"	U.S.A.	Mariner	57	12 Nov., "	Lord Howe Island ..	LIX	
*W.W.	"	N.S.W.	Labourer	19	26 Feb., 1898	Wollongong	LXI	Died, 14 May, 1911.
*A.B.	"	"	"	20	22 Mar., "	Gunnedah	LXIV	
*R.C.	"	"	Butcher	27	9 July, "	Wollongong	LXII	Died, 21 Feb., 1900.
A.G.	Female	China	Housewife	38	23 Sept., "	Waterloo	LXVI	
*J.F.D.	Male	N.S.W.	Labourer	26	11 July, 1899	Lismore	LXVII	Died, 7 July, 1901.
C.P.	"	China	Sculleryman	22	14 April, 1900	Sydney	LXVIII	
B.A.	"	Aoba Island ..	Labourer	35	26 Feb., 1901	Murwillumbah	LXIX	Died, 30 April, 1903.
C.T.	Female	Germany	Housewife	29	23 April, "	Lismore	LXX	

* These are all natives of New South Wales, of European descent. † This patient was transferred to a Hospital for the Insane on 2nd April, 1885, where also his death occurred. ‡ See note * to Appendix A. § Date of report. These patients were afterwards removed to Little Bay. || Of European descent. Patients remaining under treatment have their initials shown in black-faced type.

RETURN

RETURN showing Particulars of Lepers detained at Little Bay, New South Wales, since the year 1883—continued.

Name.	Sex.	Native of—	Occupation.	Admission.		Where from.	No. of Case in Clinical Notes.	Died or Discharged.
				Age on.	Date of.			
*D.N. ...	Male ...	N.S.W.	Labourer	18	4 June, 1901	Glen Innes	LXXI	Died, 28 Feb., 1905.
J.S.	"	"	Farmer	52	20 " "	Miller's Forest	LXXII	Discharged, 28 Feb., 1902.
*D.L.	"	England.....	Labourer	46	20 " "	Rookwood Asylum	LXXIII	Died, 15 Dec., 1902.
F.H.	"	"	Seaman	75	4 July, "	Sydney	LXXIV	Died, 5 July, 1903.
A.R.	"	China	Labourer	25	30 Oct., "	"	LXXV	Returned to Hongkong, 6 Aug., 1904.
A.T.	"	"	"	35	4 Dec., "	"	LXXVI	
G.Y.	"	"	Miner	"	8 Jan., 1902	"	LXXVII	Died, 17 Jan., 1902.
*J.G.	"	N.S.W.	Grazier.....	57	13 " 1903	"	LXXVIII	Died, 31 Aug., 1904.
M.S.	"	Ireland	Miner	45	20 Feb., "	Parramatta Asylum	LXXIX	Died, 19 Feb., 1908.
F.H.L. ...	"	China	Gardener	32	10 Mar., "	Enfield	LXXX	Returned to Hongkong, 6 Aug., 1904.
G.M.	"	England.....	Farmer	52	7 April, "	Cudgen	LXXXI	Discharged, 31 Mar., 1909.
†F.C.	"	Fiji.....	School	17	7 April, "	Fiji	LXXXII	Returned to Hongkong, 6 Aug., 1904.
A.S.	"	China	Wood-cutter	31	21 " "	Canterbury	LXXXIII	
S.V.	"	Zanzibar	Seaman	22	5 May, "	Sydney	LXXXIV	
T.B.	"	China	Cook	37	30 June, "	Canterbury	LXXXV	
W.M.	"	Buka Buka	Labourer	36	3 Nov., "	Tweed River	LXXXVI	Died, 14th March, 1914.
*F.E.B.	"	N.S.W.	Drover	27	25 " "	"	LXXXVII	
*G.M.S.	Female	"	Housewife	19	9 Feb., 1904	Lismore	LXXXVIII	Discharged, 11th Jan., 1915.
*V.M.W.	"	"	"	17	31 Mar., "	Sydney	LXXXIX	
*D.D.	Male...	"	Teamster.....	54	19 April, "	Botany	XC	Discharged, 20 Sept., 1909.
A.M.	"	China	Farmer	24	3 May, "	Tumut	XCI	Returned to Hongkong, 6 Aug., 1904.
F.B.	"	Mallicolo	Labourer	39	10 " "	Tweed River	XCII	Returned to native island, 9 May, 1908.
W.T.	"	England.....	"	65	4 July, "	Sydney	XCIII	Discharged, 20 Sept., 1906.
G.W.	"	China	Labourer	32	27 Sept., "	Narrabri	XCIV	Returned to Hongkong, 13 June, 1905.
*R.B.	"	N.S.W.	Coach-painter.....	23	11 Oct., "	Newtown.....	XCV	Discharged, 22 March, 1912.
H.F.	"	China	Miner	45	24 Jan., 1905	Emmaville	XCVI	Returned to Hongkong, 13 June, 1905.
S.M.	"	Lifu.....	Labourer.....	66	7 Feb., "	Tweed River.....	XCVII	Died, 8 Jan., 1907.
A.S.	Female	Egypt	Housewife	38	7 Mar., "	Sydney	XCVIII	Returned to Egypt, 23 June, 1905.
T.H.	Male...	Ireland	Bullock-driver	65	11 July, "	Coast Hospital	XCIX	Discharged, 19 Dec., 1905.
J.W.	"	Tanna	Labourer	40	11 " "	Maclean.....	C	Readmitted, 19 Aug., 1907
T.A.	"	Ambrym	"	35	11 " "	"	CI	Again discharged, 22 Feb., 1910.
H.G.	"	Gala	"	35	14 Nov., "	Tweed River	CII	Died, 30 Oct., 1906.
G.B.	"	Vanua Lava	"	38	9 Jan., 1906	"	CV	Died, 18th Feb., 1915.
G.A.	"	Ambrym	"	35-40	15 Aug., "	"	CVI	Died, 31 Aug., 1912.
A.M.	"	China	Gardener	30	4 Sept., "	Nyngan	CVII	Returned to native island, 1 Dec., 1908.
L.A.	"	Ambrym	Labourer	35	9 Oct., "	Tweed River	CVIII	Returned to Hongkong, 9 Nov., 1906.
C.B.	"	China	Hawker	48	9 " "	Sydney	CIX	Returned to native island, 9 May, 1908.
A.M.	"	"	Wood-cutter	58	9 " "	Glen Innes	CX	Returned to Hongkong, 9 Nov., 1906.
W.D.	"	Lifu.....	Gardener	30	20 Nov., "	Turrumurra	CXI	Died, 2 April, 1910.
P.S.	"	India	Hawker	35	19 Jan., 1907	Nowra	CXII	Abandoned, 18 May, 1907.
C.S.C.	Female	Victoria	"	40	16 April, "	Maroubra	CXIII	Died, 5 May 1913.
Ah J.	Male...	China	Hawker	40	17 Sept., "	Sydney	CXIV	
H.F.	"	"	Cabinet-maker	40	29 Oct., "	Warren	CXV	Died, 11 Aug., 1909.
F.P.	"	England.....	None	68	14 Jan., 1908	Sydney	CXVI	Died, 2 Nov., 1910.
*A.R.	Female	N.S.W.	School	7	14 " "	Lismore ..	CXVII	
T.W.C.	Male...	"	Farmer	45	18 Mar., 1909	Manilla	CXVIII	Repatriated, 1 Feb., 1911.
P.J.	"	Syria	Hawker	54	10 Nov., "	Yalgogrin	CXIX	Repatriated, 1 Feb., 1911.
A.Z.	"	Greece	Sculleryman	17	11 Oct., 1910	Sydney	CXXII	Died, 8 Oct., 1911 (before transfer).
J.C.	"	England.....	Miner	48	15 Nov., "	"	CXXIII	
J.A.	"	Syria	Hawker	35	29 " "	"	CXXIV	Died, 10th July, 1915.
C.M.	"	Tonga	Gardener	45	8 June, 1911	North Sydney	CXXV	
T.L.	"	China	Cabinet-maker	49	"	Botany	CXXVI	Died, 21 July, 1916.
M.B.	Female	Ireland	Teacher	33	7 Nov., 1911	Lismore	CXXVII	
S.C.	Male...	China	Cabinet-maker	40	21 May, 1912	Boolaroo, N.S.W....	CXXVIII	Discharged, 21 July, 1916.
L.J.T.	"	N.S.W.	School	12	14 Aug., "	Lismore	CXXIX	
S.M.	"	Mallicolo	Labourer	50	27 " "	Maclean.....	CXXX	Died, 17th June, 1915.
J.F.	"	N.S.W.	Van-driver	28	19 Sept., "	Glebe	CXXXI	
W.D.	"	"	Fisherman.....	22	24 June, 1913	Ulladulla, S. Coast	CXXXII	Died, 14th August, 1915.
J.M.	"	New Hebrides	Labourer	60	28 Nov., "	Tweed River.....	CXXXIII	
J.C.M.	"	N.S.W.	Miner	26	28 Jan., 1914	Homeville, West Maitland.	CXXXIV	Died, 15 June, 1916.
W.B.	"	England	Dealer	33	4 Mar., "	Sydney	CXXXV	
A.C.P.	"	N.S.W.	School	15	23 June, "	Lismore.....	CXXXVI	Died, 15 June, 1916.
E.W.	"	South Sea Islands,	Labourer	50	17 Nov., "	Cudgen	CXXXVII	
H.H.	"	England.....	Labourer	36	19 May, 1915	Hornsby	CXXXVIII	Died, 15 June, 1916.
A.D.	Female	New Hebrides	Domestic	19	1 Sept., "	St. Kilda, Victoria	CXXXIX	
C.F.	Mal...	China	Cabinet-maker	50	18 Dec., "	Waterloo, N.S.W.	CXL	Died, 15 June, 1916.
L.F.	"	England	Showman	45	9 Mar., 1916	Campbelltown	CXLI	
F.H.	"	China	Gardener	48	25 May, "	Sydney	CXLI	Died, 15 June, 1916.
D.M.	"	N.S.W.	Publican	46	25 " "	Armidale	CXLII	
W.J.P.	"	"	School	12	25 Nov., "	Lismore	CXLIV	Died, 15 June, 1916.
E.L.P.	"	"	"	11	25 " "	"	CXLV	

* Native of New South Wales, of European descent. † Of European descent.

NOTES.—(a) The cases of a few other persons who, for one reason or other, were never admitted to the lazaret, have been mentioned in the course of this series of Reports, and are additional to those shown in this Table. (b) On comparison with the reports for early years, differences in ages or dates of admission of some coloured patients will be observed. Those now given are the correct ages and dates.

Patients remaining under treatment have their initials shown in black-faced type.

APPENDIX C.

APPENDIX C.

I.—New Cases.

CASE CLXI.—L.F., m., æt. 45; admitted 9th March, 1916.

History.—Born at Hammersmith, London, E. Left there at 17 years of age and came directly to Brisbane, Queensland. In Queensland he moved about, never remaining longer than two years in one place, working at various occupations, chiefly on the railways, mining and droving. He lived continuously in Queensland, except for a stay of six months on the Clarence River, New South Wales, about 20 years ago, until he joined a travelling show about 1909. Since that date has been occupied with the show, travelling in Queensland, New South Wales, and Victoria.

History of illness.—He thinks the illness began with a swelling on right upper arm, which festered after application of mustard and healed in about two weeks. This occurred about eighteen months ago. Three months later macules appeared on the chest and spread slowly. The total surface of the skin was more or less involved nine months or so later.

Condition on admission.—Universal characteristic maculation of skin, including hairy scalp.

Hair of eyebrows extensively fallen; eyelashes completely. Slight supraciliary infiltration. (Bacilli obtained, right side.)

Ulnar and external popliteal nerves are slightly thickened. Slight anaesthesia left foot. Perforating ulcer of sole of left foot, near the base of little toe.

Lymphatic glands are generally slightly enlarged.

Cyanosis of extremities.

Organs of special sense. Considerable impairment of hearing. Some vascularisation and opacity of corneae.

Wassermann reaction (4th March, 1916) negative.

Treatment.—Oil chaulmoogra from 30 to 90 minims daily; taken regularly.

CASE CXLII.—F.H., m., æt. 48; admitted 25th May, 1916.

History.—Born in China. Arrived in Australia fifteen years ago. After nine years in Sydney, he paid a visit of six months to China, and two years later another visit of three years, returning to Australia (Sydney) only two months ago.

History of illness.—Illness began about five years ago, with ulceration of left foot and pains in the legs.

State on admission.—Looks very ill. Abdomen distended with free fluid. Liver hard and nodular; easily palpable $2\frac{1}{2}$ inches below the costal margin. Lungs clear.

Heart.—Heaving impulse. Urine acid, 1026 sp. gr. Faint cloud of albumen. Trace of bile.

Head.—Hair of eyebrows deficient on the outer halves. Glands of neck enlarged.

Trunk.—Some faint macular staining of back and shoulders.

Arms.—Definite reddish brown discolouration of upper arms and of the forearms, near the elbows. Superficial ulceration on the dorsa of distal interphalangeal joints of middle fingers and right ring finger. Distal phalanx of right little finger absorbed; nail still present, though deformed.

Ulnar nerves, enlarged, nodular and traceable to midarm.

Thighs and buttocks.—Extensive reddish brown maculation. Superficial ulceration and bullae, front of left knee. (Bacilli obtained from serum.)

Feet.—Skin harsh and dry. Recently healed perforating ulcer of sole at base of left great toe. Evidence of healed ulceration outer border of left foot—scar thickened and corn-like.

Left ext. popliteal nerve much enlarged and hypersensitive; right equally sensitive but not so enlarged. Some impairment of sensation of feet—hands about normal in this respect. Bacilli obtained in serum from bullae over left patella.

Wassermann reaction negative.

CASE CXLIH.—D.M., m., æt. 46; admitted 25th May, 1916.

History.—Born near Armidale, where he lived until 30 years of age. His movements thereafter were as follows:—Hastings River, three months; Armidale, six months; Upper Macleay River, five and a half years; Armidale, nine years (employed in hotel, thirty miles from Armidale); Queensland, two months early in 1915; Tamworth Hospital, in January, 1916. Admitted to Taree hospital, 22nd February, 1916; thence removed to Coast Hospital.

Occupation.—Chiefly farm work. Kept hotel for seven and a half years, from 1906 (near Armidale).

No previous illness. Parents were both healthy and died in advanced age. Five sisters and five brothers—all were fairly healthy. Two sisters are dead—one of childbirth, the other of heart trouble at 55 years.

History of illness.—Six years ago consulted a doctor for "cold," but was told that he was suffering from diabetes. Felt in usual health till twelve months later, when blisters

blisters developed on toes of left foot. Admitted to Armidale hospital and treated for two weeks for diabetes. The toes soon healed. Seven months later blisters developed on toes of right foot. This occurred in February, 1912. He was again admitted to Armidale hospital. The diagnosis still diabetes.

The same year blisters appeared on the left leg, and in November the sole of the left foot became swollen and soon broke down. The resulting ulcer discharged for several months. Two years ago the right foot was similarly affected. Since then has had swelling and ulceration of one or other foot at intervals. For three years he has had "cramps" in the legs, and six months ago he noticed slight loss of sensation in the feet.

Condition on admission.—Face—Hair of scalp, of eyebrows and eyelashes about normal. No hair on the face—probably a natural peculiarity.

Trunk.—Normal.

Upper limbs.—Hands show early characteristic deformity—flattening of arch and wasting of intrinsic muscles. Skin of hands dry and scaly.

Lower limbs.—Skin of both legs and feet is dry, harsh and scaly, with slight brownish discolouration and cyanosis. Left foot swollen and slightly tender near the ankle. Arch of each foot flattened transversely and from before back. Both great toes shortened and deformed as result of old ulceration of bone and soft tissues. No open sores at present.

Scar on plantar aspect of second metatarsal of right foot. Ulnar and external popliteal nerves are slightly enlarged, and of the latter the left is slightly hypersensitive.

There is slight impairment of sensation as tested by pin-prick of distal extremities.

Urine acid reaction, 1016 sp. gr., no sugar, no albumen. Wassermann reaction negative. Bacilli, smears from nares negative.

Treatment.—Chaulmoogra oil, 45 minims daily. Pil. Strych., gr. $\frac{1}{60}$ twice daily.

CASE CXLIV.—W.J.P., M., æt. 12; admitted 25th November, 1916.

History.—Born in Lismore. When six years of age the family removed to Casino, where they lived for two years; removing thence to Mummulgum, their present place of residence. Parents healthy. Of the nine children, five (four boys and one girl) are healthy; two (A.P. and A.C.P.) are at present inmates. The ninth is E.L.P.

History of illness.—Macules appeared on forearms seven weeks before admission. The only constitutional symptom complained of was headache, which preceded the eruption, coming on at intervals of several days, by about two years.

Condition on admission.—General health good. Weight, 5 st. 8 lb.; height, 4 ft. 10½ in.

Head.—Hair normal. No nasal obstruction.

Head and Neck.—General yellowish brown discolouration of skin, with slight diffuse infiltration of cheeks, chin, and, probably, of ear lobes. The eyebrows are perhaps slightly infiltrated. There are several more deeply pigmented areas on the neck, slightly infiltrated.

Upper limbs.—Several reddish brown slightly thickened macules, $\frac{1}{2}$ to $\frac{3}{4}$ in. in diameter. Posterior aspect of lower third of each upper arm is diffusely pigmented—brownish in colour.

Forearms and hands.—General macular staining with numerous more deeply-tinted (reddish brown) coin-sized areas, more especially on the flexor aspects—at bends of elbows these macules are definitely infiltrated.

Hands.—Slight flattening of arches. The skin is slightly swollen.

Trunk.—A few small widely-scattered macules. There is a reddish brown macule about the size of the palm of the hand, situated over the posterior half of the crest of the ilium. On the buttocks there are similar extensive macules, symmetrically disposed. A small area behind the left trochanter is definitely thickened.

Thighs display numerous large macules.

Legs.—Diffuse uniform staining. Slight cyanosis. No deformities.

Lymphatic glands of both groins enlarged.

R. ulnar nerve is moderately enlarged at the notch, the left is slightly so.

Sensation about normal.

CASE CXLV.—E.L.P., M., æt. 11 years; admitted 25th November, 1916.

History.—Born in Lismore. When five years of age the family removed to Casino, where they lived for two years; removing thence to Mummulgum, their present place of residence.

History of illness.—About four weeks before admission macules appeared on the arms and legs, but there were no constitutional symptoms.

Condition on admission.—Height 4 ft. 7¾ in., weight 4 st. 12 lb.

Hair—Normal.

Lymphatic glands.—Cervical, axillary and femoro-inguinal groups enlarged.

Head and neck.—Slight general reddish brown discolouration of skin. Molar prominences and chin definitely infiltrated.

Upper arms.—Left clear. Right—The whole dorsal surface of lower half is occupied by a large macule with slightly thickened reddish brown margins and smooth whitish centre.

Forearms

Forearms and hands.—General faint discolouration of skin with numerous small more deeply tinted maculo-papules.

Hands.—Diffuse macule on the dorsum at the base of right little finger—otherwise, about normal.

Trunk.—Reddish macule of irregular contour on the right pectoral region.

Buttocks.—Irregular maculation.

Thighs extensively involved.—The right carries numerous small maculo-papules; the left, in addition, shows on the lower two-thirds of the inner surface a large serpiginous macule similar to that on the right upper arm.

Legs.—Normal. Sensation normal. The nerves are not appreciably enlarged.

II.—Deaths.

CASE CXLII.—F.H., m., native of China; æt. 48; died 15th June, 1916. Admitted 25th May, 1916.

Patient was seriously ill and dropsical on admission. His condition gradually declined until the 14th June, when he became suddenly worse with deep jaundice.

Post mortem examination 15th June. Skin deeply jaundiced. Large amount of recent blood clot in lesser sac of peritoneum—apparently from a ruptured vessel in the liver. Pancreas enlarged and oedematous. Liver greatly enlarged and the surface is thickly studded with pea-sized nodules—on section it is seen that these nodules are evenly distributed through the whole substance of the glands. Spleen seems normal on section, but the free surface presents an area of thickened, almost calcareous, capsule. Other abdominal organs apparently normal. Thorax was not opened.

Pathological examination in Microbiological Laboratory:—

“Macroscopically the median nerve shows no definite lesions.

“The liver shows various sized soft whitish malignant-looking masses with fibrosis between them. The organ was bile-stained.

“Microscopically, sections of the liver show multilobular cirrhosis extensive in places, less so in others, occasionally becoming interstitial so that whole lobules are infiltrated. Small hæmorrhages have occurred in places into the dense strands between lobules. In addition, the tissue is extensively infiltrated by large carcinomatous masses, sometimes degenerated, with outlying smaller masses. The carcinomatous cells are very large and “juicy,” and sometimes contain large multilobed nuclear masses and sometimes show mitoses. Occasional small masses of bile pigment are found in the cells in situations far removed from unaffected lobules. The appearance of the growth is that of a primary carcinoma of the liver.

“Leprosy bacilli, some scattered, some in small globi, are scattered through this stroma. They may be found in the dense cirrhotic areas around lobules, in the finer cirrhosis between the cells, and occasionally in the delicate stroma between masses of malignant cells. In places few leprosy bacilli are seen, whilst in other similar areas they are easily met with.

“Median nerve—Sections shows light patchy fibrosis between the nerve fibres. An occasional lepra bacillus was detected.

“J. B. CLELAND,

“Principal Microbiologist.”

III.—Discharge.

CASE CXXIX.—L.J.T., m., N.S.W.; æt. 16; admitted 14th August, 1912.

Discharged, 21st July, 1916.

No signs of active trouble, but there is still some pigmentation of buttocks and thighs. Bacilli were not obtained in smears from nares and left ear lobe.

Treatment.—Chaulmoogra oil and strychnine.

IV.—Progress Report on cases remaining on 31st December, 1916 (not including those admitted during 1916).

CASE XVII.—C.T., m., Javanese; born about 1862; admitted 14th August, 1886.

Leprosy.—Condition unaltered. No active signs.

CASE LXXXII.—F.C., m., Fijian native, but of European descent; born 1886; admitted 7th April, 1903.

General health good. Weight increased from 11 st. 7 lb. to 13 st. 1 lb. No active signs. General treatment.

CASE LXXXVII.—F.E.B., m., born in N.S.W. in 1876; admitted 25th November, 1903.

General health good. Improvement maintained. Leproma on right eyebrow is now very small, but still yields bacilli. Typical macule on right buttock.

Smears.—Right nares a few bacilli. Left, negative.

Treatment.—Chaulmoogra oil resumed towards end of year.

CASE

CASE LXXXVIII.—G.M.S., f., N.S.W.; born 1885; admitted 9th February, 1904.

General health fairly good, but the disease has steadily advanced. Fresh lesions continue to appear and others to ulcerate from time to time.

Up to August all specific treatment had been declined, but in that month she began to take gynocardate of magnesium 10 gr. daily, increasing to 60 gr. in divided doses daily. Towards the end of the year there was a slight improvement in the local condition and her appetite improved.

CASE CI.—T.A., m., native of Ambrym Island; born about 1870; admitted 11th July, 1905.

General health good. Ulceration of right foot previously noted is still present. No lepra bacilli were detected (77-11-1916) in smears from this ulcer.

Treatment.—Gynocardate of magnesium, gr. 30 daily, with Pil. Strychnine, gr. $\frac{1}{80}$ twice daily, taken very irregularly.

CASE CXIII.—G.S.C., f., Victoria; born about 1867; admitted 16th April, 1907.

General health good. This patient for a number of years had been free from active signs, but towards the end of the year several fresh maculæ appeared on the neck and right shoulder.

Treatment.—Gynocardate of magnesium, gr. x, increasing to gr. 60 daily. Resumed 25th September, 1916.

CASE CXIX.—Ah Jack, m., Chinese; born about 1867; admitted 17th September, 1907.

General health good. No alteration in mental condition.

CASE CXVII.—A.R., f., N.S.W.; born 1900; admitted 14th January, 1908.

Lepra tuberosa.—In March the original attacks noted in last report recurred up to that time. Magnesium gynocardate, gr. 60 daily, was taken, but thereafter discontinued and general treatment given.

This case is not doing well; there is dyspnoea on slight exertion, and the local signs of disease are gradually advancing.

CASE CXXIII.—J.C., m., English; born about 1862; admitted 15th November, 1910.

General health good. Continued improvement. Signs have almost cleared.

Treatment.—Chaulmoogra oil continuously, with one interruption of four weeks.

CASE CXXIV.—J.A., m., Syrian; born about 1875; admitted 29th November, 1910.

General health good. No active signs. Refused specific treatment.

CASE CXXV.—C.M., m., Tongan; born about 1866; admitted 8th June, 1911.

General health good. Weight increased from 11 st. 10 lb. to 12 st. 10 lb. No active signs.

Treatment.—Chaulmoogra oil 45 minims daily till March. Further specific treatment refused.

CASE CXXVIII.—Sue Chung, m., æt. 43; admitted 21st May, 1912.

Lepra tuberosa et nervorum.—Bedridden during the whole year. Exacerbations with eruption of tender nodules at intervals. In all respects his condition is the same as at last report.

Treatment.—General and symptomatic.

CASE CXXX.—S.M., m., æt. 53; admitted 27th August, 1912.

General health good. No obvious signs. Slight swelling of hands at times, probably rheumatic.

Treatment.—Chaulmoogra oil 45 minims daily and Pil. Strych. gr. $\frac{1}{80}$ twice daily continuously, with the exception of an interval of four weeks in May and June.

CASE CXXXI.—J.F., m., æt. 29; admitted 19th September, 1912.

General health good. Improvement noted in last report continued. Weight increased from 10 st. 4 lb. to 11 st. Local signs steadily improving.

Treatment refused.

CASE CXXXII.—W.D., m., aboriginal native of N.S.W.; æt. 25; admitted 9th June, 1913.

General health good. Weight increasing; no obvious signs.

Treatment.—Chaulmoogra oil 30 to 45 minims daily, with Pil. Strych. gr. $\frac{1}{80}$ twice daily.

CASE CXXXIII.—J.M., m., native of Palmer Island, New Hebrides; æt. about 62; admitted 23rd April, 1913.

General health gradually declining. Eruption of lepromata from time to time. Impairment of mind noted in last report became steadily more pronounced, and towards the end of the year restraint was necessary to prevent him injuring the other inmates.

Treatment generally refused.

CASE CXXXVI.—A.C.P., m., N.S.W., æt. 17; admitted 23rd June, 1914.

General health good. Weight maintained. Condition unaltered, disease well in evidence.

Treatment.—Chaulmoogra oil 45 minims daily, with Pil. Strych. gr. $\frac{1}{60}$ twice daily.

CASE CXXXVII.—E.W., m., æt. 52; admitted 17th November, 1914.

General health good. No active signs.

Treatment.—Chaulmoogra oil 45 minims daily, with Pil. Strych. gr. $\frac{1}{60}$ twice daily, taken regularly.

CASE CXXXVIII.—H.H., m., æt. 38; England; admitted 19th May, 1915.

General health good. Weight increasing. Marked improvement in local signs.

Treatment.—Chaulmoogra oil 45 minims daily, with Pil. Strych. gr. $\frac{1}{60}$ twice daily, with Pil. Strych. gr. $\frac{1}{60}$ twice daily. General treatment and dailyunction of Chaulmoogra oil only during latter half of year.

CASE CXXXIX.—A.D., f., æt. 20; born at Oobu; father, French; mother, New Hebridean; admitted 1st September, 1915.

General health fairly good. Ozæna. Suffered from a typical attack of herpes zoster in March. Ulceration of left leg.

Treatment.—Gynocardate of magnesium, commenced with gr. x daily on 24th August, gradually increasing to gr. 60 daily on 21st September.

3.—DAVID BERRY HOSPITAL.

REPORT OF THE SECRETARY FOR YEAR 1916.

Sir,

I have the honor to submit the following report on the working of the David Berry Hospital for the year 1916.

STAFF.

Medical officer	C. W. GEORGE, M.B., Ch.M.
Matron	MISS J. BEATTY.
Secretary... ..	H. BRUCE.

This State Hospital is situated about a mile from the Berry Railway station, in the Shoalhaven District, and the area set apart for the purposes of the Institution is about 30 acres.

For the year the number of patients treated was 35 less than for 1915. This decrease, it is surmised, is due largely to the number of men who have left the district to take up military duties abroad, as the shortage is wholly in the number of males treated.

The total patients for the year was 206, as compared with 241 in 1915. The following is a summary of the principal statistics :—

	Males.	Females.	Total.
Patients remaining in Hospital, 31st December, 1915...	8	6	14
Patients admitted and registered during 1916	82	110	192
Total under treatment	90	116	206

The result of the total number is as under :—

Discharges—

Recovered	148
Relieved	38
Unrelieved	1
Died	13

200

Leaving under treatment on 31st December, 1916 6

Total 206

Out-patients.—The out-patients treated numbered 14—males, 10; females, 4.

The rate of mortality upon cases treated was 6·3, as compared with 2·5 during last year. Of the 13 deaths recorded, 6 were post-operative, 3 being practically moribund on admission; another was amputation of the leg of an old man of 70 years for gangrene, and another from gunshot wound in abdomen.

The average daily number of patients resident was 9·25—Males, 4·10; Females, 5·15. The average duration of the stay of patients was 16·5 days.

Operations.—There was a great amount of operative work during the year, the number of operations being 118 as compared with 75 in 1915. Assistance was rendered by the Doctors of Nowra on 98 occasions, as follows :—Dr. Rodway, 17; Dr. Molesworth, 12; and Dr. Foy, 69. Included in the total are three (3) major operations by Dr. Molesworth.

The assistance and co-operation of the Nowra doctors is much appreciated by the Department.

Infectious Cases.—Only 15 cases of infectious disease required treatment at the Hospital, namely, 6 cases of diphtheria and 8 cases of scarlet fever, while another case developed scarlet fever and diphtheria at the same time.

Collections.—The amount collected for fees and sales during the twelve months totalled £228 5s. 3d. as compared with £248 8s. 4d. the year before. The number of patients who contributed towards their maintenance was 68.

Expenditure.—Rigid economy has been carried out during the year, and all requisitions reduced to the lowest possible amounts consistent with the successful working of the Institution.

The total expenditure was £1,947 0s. 8d., as against £1,852 12s. 6d. during 1915. This covers every item of expenditure, including the fees paid for anaesthetics administered by the Nowra doctors. The increase—£94 8s. 2d.—is due to the higher salaries paid the Staff under the amended regulations of the Public Service Act, 1902.

Additions and Improvements.—No additions or improvements of any description have been made during the period under review.

Repairs.—The only large items of expenditure made under this heading were for new plate-glass in the operating theatre and repairs to all mattresses.

During the month of January a visit was paid by the Hon. George Black (the Minister for Public Health) who expressed himself as very satisfied with this well-appointed Hospital. Several alterations and repairs were recommended by him, including the painting of all buildings, &c. Tenders have already been received for same, and the work is expected to be carried out shortly.

Buildings.—The buildings are all in a sound state of preservation, with the exception of the Lodge, where the white ants have again made their appearance.

Grounds.—The grounds are in good order considering the limited amount of labour engaged on the out-door work. The vegetable gardens are now yielding a considerable quantity of vegetables for the use of the Hospital.

General.—Periodical visits have been made during the year by Mr. T. H. Neely, Secretary to the Department, in connection with matters appertaining to the successful working of the Institution.

The medical officer reports that an X-Ray apparatus is badly needed at the Hospital.

Changes in Staff.—Early in the year Miss Beatty, formerly matron of the Tamworth Hospital, was appointed matron in lieu of Miss F. M. Perkins, who left to take up military duties abroad.

The conduct of the Staff and the manner in which they have carried out their duties have been satisfactory.

Tables are appended showing the number of patients under treatment, nature of diseases, &c.

RETURN of the number of persons under treatment, the order of the disease for which they were treated, and the number of deaths in each order during the year 1916.

	Discharged during the year.				Remaining in on 31st December, 1916.	Total.
	Cured.	Relieved.	Un-relieved.	Died.		

I.—GENERAL DISEASES.

Epidemic Diseases.

1 Typhoid Fever	2	...	...	1	...	3
7 Scarlet Fever	9	...	...	...	...	9
9 Diphtheria	4	1	...	1	...	6
10 Influenza	7	...	...	...	...	7
19 Other Epidemic Diseases	1	...	...	...	...	1

Other General Diseases.

20 Purulent Infection, Septicæmia .....	...	...	...	1	...	1
38 Gonococcus Infection .....	...	1	...	...	1	2
45 Cancer—Other Organs.....	...	1	...	...	...	1
46 Other Tumours (Tumours of the Female Genital Organs excepted)	2	...	...	...	...	2
47 Acute Articular Rheumatism	3	...	...	...	...	3
	28	3	...	3	1	35

II.—DISEASES OF THE NERVOUS SYSTEM AND OF THE ORGANS OF SPECIAL SENSE.

64 Cerebral Hæmorrhage (Apoplexy)	1	2	...	1	...	4
69 Epilepsy .....	...	1	...	...	...	1
72 Chorea.....	...	1	...	...	...	1
73A Hysteria .....	...	1	...	...	...	1
74 Other Diseases of the Nervous System.....	5	1	1	...	...	7
76 Diseases of the Ear .....	...	1	...	...	...	1
	6	7	1	1	...	15

III.—DISEASES OF THE CIRCULATORY SYSTEM.

78 Acute Endocarditis .....	...	...	...	1	...	1
79 Organic Diseases of the Heart.....	...	1	...	...	...	1
83 Diseases of the Veins (Varicos, Hæmorrhoids, Phlebitis, &c.).....	1	3	...	...	...	4
	1	4	...	1	...	6

Return of the Number of Persons under Treatment, &c.—*continued.*

	Discharged during the year.				Remaining in on 31st December, 1916.	Total.
	Cured.	Relieved.	Un- relieved.	Died.		
89 Acute Bronchitis	1	1	...	1	...	3
90 Chronic Bronchitis .....	...	1	...	...	...	1
92 Pneumonia.....	2	...	...	1	...	3
93 Pleurisy.....	1	...	...	...	...	1
	4	2	...	2	...	8

IV.—DISEASES OF THE RESPIRATORY SYSTEM.

99 Diseases of the Mouth and Adnexa.....	40	...	...	...	...	40
102 Ulcer of the Stomach .....	...	2	...	...	...	2
103A Gastritis	2	...	...	...	...	2
105 Diarrhoea and Enteritis (2 years and over)	1	...	...	...	...	1
108 Appendicitis, Typhlitis.....	10	...	...	3	...	13
109 Hernia, Intestinal Obstruction	5	1	...	...	...	6
110A Diseases of the Anus and Fœcal Fistula	1	...	...	...	...	1
114 Biliary Calculi.....	1	1	...	...	...	2
117 Simple Peritonitis.....	...	...	...	1	...	1
	60	4	...	4	...	68

V.—DISEASES OF THE DIGESTIVE SYSTEM.

VI.—NON-VENEREAL DISEASES OF THE GENITO-URINARY SYSTEM AND ADNEXA.

119 Acute Nephritis	1	...	...	...	...	1
125 Diseases of the Urethra, Urinary Abscess, &c. ....	...	1	...	...	...	1
127 Non-venercal Diseases of the Male Genital Organs	7	...	...	...	...	7
128 Uterine Hæmorrhage	14	7	...	...	...	21
129 Uterine Tumour.....	1	...	...	...	...	1
130 Other Diseases of the Uterus	1	...	...	...	...	1
132 Salpingitis, other Diseases of the Female Genital Organs.....	3	2	...	...	...	5
	27	10	...	...	...	37

VII.—PUERPERAL CONDITION.

141 Puerperal Diseases of the Breast .....	...	1	...	...	...	1
	...	1	...	...	...	1

VIII.—DISEASES OF THE SKIN AND OF THE CELLULAR TISSUE.

142 Gangrene.....	...	...	...	1	...	1
144 Acute Abscess	1	1	...	...	...	2
145 Other Diseases of the Skin and Adnexa ..	3	1	...	...	...	4
	4	2	...	1	...	7

IX.—DISEASES OF THE BONES AND OF THE ORGANS OF LOCOMOTION.

146 Diseases of the Bones	1	1
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XII.—OLD AGE.

151 Senility	2	2
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XIII.—VIOLENCE.

160 Suicide—Cutting or Piercing Instruments	1	1
170 Accident (Firearms)	3	1	...	4
171 Accident (Cutting or Piercing Instru- ments	1	...	...	...	...	1
172 Accident (Falls) .....	...	1	...	...	1	2
175B Accident (Vehicles and Horses)	3	...	...	...	2	5
185 Accident (Fractures).....	1	...	...	...	...	1
	9	1	...	1	3	14

Return of the Number of Persons under Treatment, &c.—*continued*.

	Discharged during the year.				Remaining in on 31st December, 1916.	Total.
	Cured.	Relieved.	Un- relieved.	Died.		
XIV.—ILL-DEFINED DISEASES.						
189 Unspecified or Ill-defined	7	...	...	...	2	9
189B No Disease (Feigned Disease)	3	...	...	...	...	3
	10	...	...	...	2	12

SUMMARY.

<i>Total Cases.</i>						
I. General Diseases	23	3	...	3	1	35
II. Diseases of the Nervous System and Organs of Special Sense	6	7	1	1	...	15
III. Diseases of the Circulatory System.....	1	4	...	1	...	6
IV. Diseases of the Respiratory System.....	4	2	...	2	...	8
V. Diseases of the Digestive System	60	4	...	4	...	68
VI. Non-venereal Diseases of the Genito- Urinary System and Adnexa.....	27	10	...	...	...	37
VII. Puerperal Condition.....	...	1	...	...	...	1
VIII. Diseases of the Skin and of the Cellular Tissue	4	2	...	1	...	7
IX. Diseases of the Bones and of the Organs of Locomotion .....	...	1	...	...	...	1
XII. Old Age .....	...	2	...	...	...	2
XIII. Violence	9	1	...	1	3	14
XIV. Ill-defined Diseases	10	...	...	...	2	12
	149	37	1	13	6	206

OPERATIONS performed during 1916 :—

	Recovered.		Died.		Total.
	Males.	Females.	Males.	Females.	
I.—Alimentary System.					
Volvulus	1	.....	.....	.....	1
Rectal polypus	1	.....	.....	.....	1
Appendicectomy.....	3	4	2	.....	9
Laparotomy .. $\left\{ \begin{array}{l} a \text{ Exploratory} \\ b \text{ peritonitis} \\ c \text{ gunshot wound} \end{array} \right\}$	$\left. \begin{array}{l} 4 \\ 1 \\ 1 \end{array} \right\}$	3	1	1	6
Hæmorrhoids .....	.....	1	.....	.....	1
Ischio-rectal abscess	2	.....	.....	.....	2
Hernia—					
(a) Inguinal	2	.....	.....	.....	2
(b) Strangulated	1	.....	.....	.....	1
	13	6	3	1	23
2.—Genito-Urinary System.					
Circumcision	7	.....	.....	.....	7
Urethral stricture	1	.....	.....	.....	1
Urethral abscess	1	.....	.....	.....	1
	9	.....	.....	.....	9
3.—Cellular and Cutaneous System.					
Incisions	1	7	.....	.....	8
Removal of splinter	1	.....	.....	.....	1
Excision of fibroma .....	.....	2	.....	.....	2
	2	9	.....	.....	11
4.—Reproductive System.					
Salpingoophorectomy .....	.....	1	.....	.....	1
Curettage .....	.....	16	.....	.....	16
Examination P.V. ....	.....	2	.....	.....	2
Excision of breast .....	.....	1	.....	.....	1
Fibroma, uterus, and appendicectomy .....	.....	1	.....	.....	1
	.....	21	.....	.....	21

OPERATIONS performed during 1916—continued.

	Recovered.		Died.		Total.
	Males.	Females.	Males.	Females.	
5.— <i>Osseous and Arthritic System.</i>					
Amputation—finger.....	1	.....	.....	.....	1
Opening knee joint	2	.....	1	.....	3
Reducing fracture	2	2	.....	.....	4
Osteotomy.....	.....	1	.....	.....	1
Amputation of leg.....	.....	.....	1	.....	1
„ hand .....	.....	1	.....	.....	1
	5	4	2	.....	11
6.— <i>Respiratory System.</i>					
Empyema.....	1	.....	.....	.....	1
Adenoids and tonsils.....	21	19	.....	.....	40
Tracheotomy	1	.....	.....	.....	1
Stitching cut throat.....	1	.....	.....	.....	1
	24	19	.....	.....	43
SUMMARY.					
I. Alimentary System.....	13	6	3	1	23
II. Genito Urinary System	9	.....	.....	.....	9
III. Cellular and Cutaneous System	2	9	.....	.....	11
IV. Reproductive System .....	.....	21	.....	.....	21
V. Osseous and Arthritic System	5	4	2	.....	11
VI. Respiratory System.....	24	19	.....	.....	43
	53	59	5	1	118

Anæsthetics used.

Chloroform	10
Chloroform and ether	100
Kelene (Local)	2
Quinine and urea hydrochloride	2
No anæsthetic given	4

118

Antitoxin used—56,000 units.

SUMMARY.

	1913.	1914.	1915.	1916.
Number of patients treated	266	233	241	206
„ „ admitted	252	216	224	192
„ operations	78	56	75	118
„ deaths post-operative	3	1	...	6
„ deaths from other causes	8	23	6	7

H. BRUCE,
Secretary.

4.—LADY EDELINE HOSPITAL FOR BABIES.

"GREYCLIFFE," VAUCLUSE.

3rd Annual Report.

Board of Directors.

President : Mrs. F. FLOWERS.

Vice-Presidents : Mrs. W. A. HOLMAN,
Mrs. D. R. HALL.

Hon. Secretary, Ladies' Committee : Mrs. M. B. MERGENTHEIM

Directors :

Mrs. G. BLACK,	Mrs. V. LUDLOW,
Mrs. W. G. BOORMAN,	Mrs. E. J. MAINCKE,
Mrs. J. H. CANN,	LADY MAITLAND,
Mrs. DAVIES,	Mrs. MELVILLE,
Miss A. GOLDING,	Mrs. OGILVIE,
Mrs. A. GRIFFITH,	Mrs. ROGERS,
Mrs. HARKNESS,	Mrs. SEERY,
Mrs. IRELAND,	Mrs. J. L. TREPLÉ.

Chairman : Dr. ROBERT T. PATON.

Vice-Chairman : Mr. A. W. GREEN.

Honorary Medical Officers.

Visiting Medical Officers :

Dr. C. W. REID, Dr. L. R. PARKER,
Dr. H. C. ADAMS.

Consulting Physician : Dr. STORIE DIXSON.

Consulting Surgeon : Dr. CHARLES MACLAURIN.

Hon. Secretary : Mr. T. H. NEELY.

Matron : Miss E. M. E. MANCE.

Sister : Miss. L. BOND.

Nine Nurses.

The number of patients treated in 1916 was 271, being 17 less than in 1915, when there were 288. The decrease in numbers was due to the occurrence of fewer cases of gastro-enteritis. In January the epidemic began to ease down, the death rate for that month being only 7. It is satisfactory to note that the mortality rate for the year has declined from 24.6 to just under 17 per cent. The warning and advice given through the columns of the Press by the Minister for Public Health had in many instances the desired effect, and throughout the year children were brought in for treatment in the early stages of the disease.

Each month the admissions and deaths have been on the decrease, owing no doubt to the mild weather and also to the fact that the work of the baby clinics is becoming more widely known.

The one day a week clinic at the Board of Health has been discontinued owing to the small attendance, and also because the mothers find it more convenient to go to the baby clinic in their own district. This arrangement is found to be more satisfactory. The district clinic nurses see the child almost immediately after discharge from this hospital, and are then able to supervise its feeding and assist the mothers with advice whenever necessary.

During the winter months pneumonia, bronchitis, and whooping cough were very prevalent, but the death rate was low. During December a number of cases of gastro-enteritis were admitted.

Improvements, &c.

During the year the dispensary has been completed, and proves a most useful addition.

Arrangements have been made to instal a new hot water service, as the present one is obsolete, and very unsatisfactory.

Staff.

Five pupil nurses received lectures, and will sit for examination early in 1917. Five pupil nurses have completed their course, and left the hospital.

There have been several changes in the staff this year, Miss Burne (matron) resigned and was transferred to State Hospital and Asylum, Liverpool. Sister Furber resigned in order to go to England, and Sister Bond was appointed. Nurse Barber resigned and nurse Watkins was appointed in her place. I succeeded Miss Burne as matron, and began duty here on 18th November, 1916.

The domestic staff at present numbers one staff cook, four mothers with babies, and one waiting woman. These women share the work of the institution.

Ladies'

Ladies' Committee.

Many donations have been received during the year, and thanks are tendered to those ladies who have taken such a kindly interest in the hospital staff. The Balance-sheet of the Ladies' Auxiliary Fund is presented below; it shows that many articles have been purchased for the comfort of the inmates, and that a substantial sum remains to the credit of the Fund.

LADY EDELINE HOSPITAL FOR BABIES, "GREYCLIFFE," VAUCLUSE.

Ladies' Auxiliary Fund.

STATEMENT of Receipts and Expenditure from 1st January to 31st December, 1916.

RECEIPTS.			EXPENDITURE.		
	£	s. d.		£	s. d.
Balance	99	11 2	Sterilizer	5	0 0
Donations, &c.	67	19 10	Pianoforte	50	0 0
" Alice Weaver Cot	30	0 0	Furniture	6	9 10
			Drapery	8	8 6
			Sundries	2	18 4
			Balance, Government		
			Saving Bank	£100	0 0
			Balance, Current A/c.	24	14 4
				124	14 4
Total	£197	11 0	Total	£197	11 0

The Number of Babies treated in the hospital during the year, and the results of treatment is shown in the following tables:—

	Under 3 months.	Under 6 months.	Under 2 years.	Over 2 years.	Total.
Infants—Admitted during 1916	61	63	141	6	271
Died	14	16	16	...	46

Discharges—Cured.....	177
" Relieved	9
" Unrelieved	11
Died	46
Remaining in hospital 31st December, 1916	28
	271

Mortality rate, 16·97 per cent.

Number of cots in institution	30
" beds for mothers.....	8
Average daily number of cots occupied	20
" " beds for mothers	6

TABLE showing the nature of illness for which Infants were treated during 1916.

	Cured.	Relieved.	Unrelieved	Died.	Remain in Hospital.	Total.
Gastro-enteritis	121	4	5	35	28	193
Coletis	2	1	1	.....	.....	4
Marasmus	16	.....	.....	4	.....	20
Pneumonia	9	.....	.....	3	.....	12
Broncho-pneumonia	3	.....	.....	.....	.....	3
Bronchitis	6	.....	.....	.....	.....	6
Ricketts	1	.....	.....	.....	.....	1
Erysipelas .....	.....	.....	1	.....	.....	1
Meningitis .....	.....	.....	.....	1	.....	1
Hirschsprungs Disease.....	.....	1	.....	.....	.....	1
Gastro-Whooping Cough.....	.....	1	1	1	.....	3
Intersusception .....	.....	.....	1	.....	.....	1
Whooping Cough	1	.....	1	1	.....	3
Constipation	1	.....	.....	.....	.....	1
Dentition	14	.....	.....	.....	.....	14
(?)	4	1	1	1	.....	7
						271

E. M. E. MANCE,
Matron.

5.—STRICKLAND CONVALESCENT HOME FOR WOMEN, “CARRARA,” ROSE BAY.

SECOND ANNUAL REPORT, 1916.

Staff.

Hon. Visiting Medical Officer : DR. C. W. REID.

Matron : Miss J. M. SHIELL.

Nurses : Miss N. WALES and Miss L. STACKER.

Patients in Hospital on 31st December, 1915	...	...	30
„ admitted during the year	...	...	501
			—531
„ Discharged	...	...	507
„ Died	...	...	Nil.
			—
Remaining in Hospital, 31st December, 1916	...	...	24
Daily average number of patients	...	...	29

THE home, which is situated in one of the most picturesque parts of Rose Bay, was opened by the Government in 1914 as a convalescent hospital for women.

There are available for patients ten large and lofty rooms, most of them holding two or three beds only, so that patients congenial to each other are, as far as possible, placed together. There is also accommodation for mothers, with cots for the babies. The rooms are furnished with wardrobes, chests of drawers, and washstands. The Rest room is a very wide hall overlooking the tennis court, furnished with lounges and comfortable basket chairs, and provided with a Bobs table and other amusements. The dining-room is a large bright room, furnished with small tables, each table seating four or five patients. The house is beautifully situated, with wide verandahs and large extensive grounds leading down to the beach and bathing-house.

The majority of patients have been transferred from metropolitan hospitals after serious operations; there were also a few convalescent enteric fever cases, and a number of other patients admitted who greatly needed rest and change. A number of cases were also sent to “Carrara” from the Hospital Admission Dépôt, Board of Health, and from the Baby Clinics.

The ward of four beds and cots reserved for delicate mothers with babies in arms has been fully occupied, and clinic nurses report that the mothers derive great benefit from the rest and change at the Convalescent Home, the majority of the patients improving rapidly.

The vegetable garden and dairy keep the hospital well supplied with vegetables and milk, and there is also a good supply of eggs.

I. M. SHIELL,
Acting Matron.

C.—CONVALESCENT HOSPITAL FOR MEN, "DENISTONE HOUSE," EASTWOOD.

SECOND ANNUAL REPORT, 1916.

Staff.

Visiting Medical Officer : DR. GUTHRIE HUNTER.

Matron : Miss E. E. MURRELL (on active service).

Nurse : Miss HANSON, and four Attendants.

During the year 219 patients were treated—

Patients in Hospital on 31st December, 1915 ...	...	18
„ admitted during the year 1916 ...	...	209
„ died „ „ „ „ ..	...	Nil
„ remaining in Hospital, 31st December, 1916 ...	9	
„ discharged during the year, 1916 ...	...	206
Daily average number of patients, 1916 ...	...	16
Average length of stay in Hospital (days) ...	...	28

The Hospital contains accommodation for 25 men. There are spacious verandahs, a fine dining-room with a piano, and gramophone, and a smoke-room fitted up with a bobs table; the latter is much appreciated by the patients.

The patients admitted during the year were mostly convalescent, after an acute illness. The remainder were chronic cases, with very few exceptions. They seemed to derive much benefit from their stay at the Hospital.

There have been a few confined to their beds for two or three days, requiring medical attention. Dr. Hunter attending when necessary.

Behaviour of patients, generally good.

Several entertainments have been given at the institution by musical societies, &c., and were much appreciated by the patients.

Patients are met from the train leaving Sydney (12.40) every day, except Saturdays, Sundays, and public holidays.

The new vegetable garden has been a great success.

Approximate weight of vegetables grown, quantities of milk, and number of eggs produced at the Hospital :—

Vegetables ...	...	...	...	...	11,700 lb.
Milk ...	...	...	...	...	3,147 gallons.
Eggs ...	...	...	...	...	9,235
Fruit ...	...	...	...	...	660 lb.

The work, assisted by inmate labour, is carried out by officers in charge.

G. McPHAIL,

Acting Matron.

7.—WATERFALL STATE SANATORIUM, N.S.W.

REPORT OF THE MEDICAL SUPERINTENDENT FOR THE YEAR 1916.

Honorary Staff.

Honorary Consulting Physician	Dr. S. H. MACCULLOCH.
Honorary Physician	Dr. CECIL PURSER.

Resident Staff.

Medical Superintendent	Dr. H. W. PALMER.
Assistant Medical Officer	Dr. H. BARÉT.
Manager	Mr. C. MACDERMOTT.
Matron	Miss K. WALSH.
Clerk and Storekeeper	Mr. A. DOUGLASS.

CONSTITUTION of Hospital Staff on 31st December, 1916.

Medical and Administrative.	No.	Nursing.	No.	General.	No.
Medical Superintendent...	1	Nurses	22	Foreman	1
Assistant Medical Officer..	1			Artisans	2
Manager.....	1			Male Cooks	2
Matron	1			Kitchenman.....	1
Clerk	1			Attendants	6
				Female Cook	1
				Female Servant	1

NUMBER of Wards and Beds.

No. of Ward.	Capacity in cubic feet.	No. of Beds and Cots.	Cubic feet to each bed.	No. of Ward.	Capacity in cubic feet.	No. of Beds and Cots.	Cubic feet to each bed.	No. of beds in open air.
1	28,800	28	1,028	7	28,800	28	1,028	.....
2	28,800	28	1,028	8	28,800	28	1,028	.....
3	28,800	28	1,028	9	28,800	28	1,028	58
4	28,800	28	1,028	10	28,800	28	1,028	.....
5	21,600	18	1,200	11	28,800	24	1,200	.....
6	21,600	18	1,200	12	28,800	24	1,200	.....

Admissions and Discharges.

Patients in residence on 31st December, 1915	346
Patients admitted during 1916	505

Total number of patients under treatment	851
Patients discharged	356
Patients died	156
	512

(Death-rate percentage of total discharges, 30·4)

Patients remaining in residence, December 31st, 1916	339
-------------------------------------------------------------	-----

Condition of discharged patients :—

Arrested cases	83
Much improved cases	91
Improved cases	137
Unimproved cases	45
	356
Average daily number of beds occupied	349
Average residence of all discharged patients... ..	217
" in days of arrested cases	309
" much improved cases	272
" improved cases	123
" unimproved cases	87
" deceased patients	259

	£	s.	d.
Total cost of maintenance and treatment of patients	18,779	13	6
Average cost per bed per annum, patients only	53	16	2
Average cost per bed, patients and inmates	43	13	5

I HAVE

I HAVE to report that during the year 1916 there were 544 male and 307 female patients under treatment. Of this number 238 male and 108 female patients were in residence on 1st January, and 306 male and 199 female patients were admitted during the last twelve months.

During this period 356 patients were discharged, and 156 deaths occurred.

Of the patients discharged, 43 male and 40 female patients had the disease arrested, having no signs of active disease, and able to do a moderate amount of work.

Besides these, 56 male and 35 female patients were much improved, and able to return to ordinary life.

Of the remainder, 104 male and 33 female patients were somewhat benefited by their stay here, while 45 patients showed no apparent improvement. Of those unimproved, one-half did not stay in a fortnight.

These results compare fairly well with those of previous years, and again demonstrate the need of treating the disease while in the early stage. The length of stay has increased, unfortunately, due to the gradual collecting of advanced cases since the opening of the Sanatorium, nearly eight years ago. It is not due to suitable cases prolonging their stay to make sure of their cure, which is a condition often to be desired.

The treatment carried out during the year has been practically along sanatorium lines, open-air treatment, liberal diet, and, in the few suitable cases, the use of the different tuberculins.

Unfortunately, during the year very few suitable cases were admitted.

The Patients' Amusements Committee has also very largely helped towards the general improvement with their periodical concerts, competitions, and their methods of recreation.

Notwithstanding the increased cost of all requirements and increases in salary to the staff, by strict economy in all branches our expenditure per bed remains remarkably low, though this year there is a slight increase. Further economies can only be carried out by the elimination of necessary services.

Towards the end of the year the Public Service Regulations affecting hospital employees came into force, necessitating considerable work in rearranging the working conditions, which are now satisfactory, while the question of leave is finally settled.

We are still without the services of our submatron, who is absent on war duty. This and the increasing number of bed patients has made the work exceptionally heavy, but the staff has carried out all demands satisfactorily, while very little sickness amongst them has occurred.

No structural additions have been undertaken during the year, though our steam service piping was relagged.

Our own local improvements were confined to enlarging the orchard and vegetable areas, which immediately becomes reproductive.

The vegetable garden and the pig returns were again very satisfactory, while the orchard is giving very good returns.

Notwithstanding, no real advance has been made on previous years. The attempts to deal with consumption are exactly the same as they were eight years ago. Our own methods are practically the same. For years we have drawn attention to the desirability of treating advanced cases elsewhere, and allowing the Sanatorium to carry on its true functions, dealing only with favourable cases. As pointed out last year, hopeful cases cannot be treated satisfactorily or economically alongside dying patients, and as with us these latter are twice as numerous, the conditions become almost impossible.

As in the case of venereal diseases, a comprehensive national scheme is needed to deal systematically with Tuberculosis, it being quite as dangerous to the public health.

Notwithstanding the war and the financial stringency, it is to be hoped that the Health Authorities will treat the whole of this question as a very pressing and urgent one, for only along such lines does it at present appear that advancement can take place.

H. W. PALMER, M.B., Ch.M.,
Medical Superintendent.

C. MACDERMOTT,
Manager.

CONDITION of Patients on Admission and Discharge during Year 1916.

Condition on Admission.	Arrested.	Much improved.	Improved.	Not improved.	Died	Total.	Remarks.
Incipient.....	10	7	2	19	These cases seldom stay long. Includes all chronic cases.
Moderately early.....	56	63	33	13	7*	172	
Moderately advanced	17	21	81	17	33	169	
Far advanced .....	...	...	21	15	116	152

* The seven deaths under the moderately early cases were in over two years.

Arrested Cases.—Have no sign of active disease; temperature normal; no sputum, and able to do a fair amount of work.

Much Improved.—Have slight signs of active disease; temperature normal; with or without sputum; fit for light work.

Improved.—Disease more or less active, with varying degrees of improvement since admission.

Not Improved.—Disease progressing, or no apparent improvement.

TABLE to correct Value of Averages and Results—1916.

	In residence over 3 years.	In residence over 2 years and under 3 years.	In residence over 1 year and under 2 years.	In residence over 6 months and under 12 months.	In residence 14 days and under 1 month.	In residence under 14 days.
Arrested cases	3	5	13	33	...	...
Much improved.....	2	4	13	21	...	...
Unimproved .....	...	...	3	5	2	23
Deaths	6	11	15	25	13	11

Sanatorium cases generally stay six to twelve months. Cases staying over this period affect results adversely, as do patients who stay a very short period. Such cases only are given in this list.

BIRTHPLACES of Patients discharged in 1916.

Country.	No. of patients.	Country.	No. of patients.
New South Wales	254	United States of America	4
England	103	Italy	3
Victoria	34	Poland	2
Ireland	29	Syria	2
Scotland	27	Austria.....	1
New Zealand	12	Greece	1
Tasmania.....	8	India	1
France	7	Isle of Man	1
South Australia	6	Norway	1
Wales	5	Mauritius	1
Queensland	4	South Africa	1
Russia	4	West Indies.....	1

OCCUPATIONS of Patients discharged or died during 1916.

Housewife	82	Bricklayers	3	Soldiers	2
Housework	75	Chemists	3	Billiard marker	1
Labourers	58	Engineers	3	Boxmaker	1
Clerks	26	French-polishers	3	Brickmaker	1
Horse-drivers	23	Gardeners	3	Buttermaker	1
Children	14	Grocers	3	Coal lumper	1
Shop assistants	13	Grooms	3	Coal trimmer	1
Miners, (quartz)	11	Iron trade	3	Contractor	1
Carpenters	10	Jewellers	3	Coppersmith	1
Seamen	9	Nurses	3	Floor-layer	1
Commercial travellers	8	Plasterers	3	Hatter	1
Tailoring	8	Rockchoppers	3	Ironmonger	1
Cooks.....	7	Solicitors	3	Kitchenman	1
Farmers	7	Stewards	3	Laundress	1
Printers	6	Wharf labourers	3	Machinist	1
Railway employees	6	Brickmakers	2	Motor driver	1
Stonemasons	6	Butchers	2	Musician	1
Dressmakers	5	Coachbuilders.....	2	Plumber	1
Firemen	5	Collectors	2	Policeman	1
Overseers	5	Cutlers.....	2	Sailmaker	1
Painters	5	Electricians	2	Salvation Army officer	1
Bootmakers	4	Fishermen	2	Sawyer	1
Drapers	4	Glassworkers	2	Shearer	1
Engine-drivers	4	Hairdressers	2	Storeman	1
Factory hands	4	Journalists	2	Teacher	1
Hawkers	4	Packers	2	Undertaker	1
Barmen	3	Postmen	2	Upholsterer	1
Boilermakers	3				

AGES of Patients discharged and deceased, 1916.

1 to 9 years.	10 to 19 years.	20 to 29 years.	30 to 39 years.	40 to 49 years.	50 to 59 years.	60 to 69 years.	70 to 79 years.	80 to 89 years.
8	30	138	139	109	63	19	6	...

8.—ROOKWOOD STATE HOSPITAL AND ASYLUM FOR MEN, LIDCOMBE.

REPORT OF THE MEDICAL SUPERINTENDENT FOR THE YEAR ENDED
31st DECEMBER, 1916.

Honorary Staff.

Honorary Staff Surgeon.—The Hon. J. B. NASH, M.D., M.R.C.S., Eng, M.L.C.
Honorary Ear, Throat, and Nose Surgeon.—W. A. DUNN, M.R.C.S., Eng.
Honorary Ophthalmic Surgeons.—H. J. W. BRENNAN, M.B., M.Ch ; A. WALLACE
WEIHEN, M.D., B.Sc. ; GUY POCKLEY, M.B., M.S.
Honorary Dermatologist.—CHAS. AYRES, M.B., Ch.M.
Honorary Neurologist.—ANDREW DAVIDSON, M.D.
Honorary Assistant Surgeons.—WM. CHAS. GREY, M.B., M.S. ; PIERO FIASCHI,
M.R.C.S., Eng. ; and JAMES REIACH, M.B., M.S.
Honorary Masseurs.—Lieut. R. BERNARD JOB ; Messrs. CAMPBELL and EVANS.
Honorary Dentist.—W. J. O'KANE, L.D.S., R.C.S., Eng.

Resident Staff.

Medical Superintendent (resident).—R. A. FOX, M.B., Ch.M.
Assistant Medical Officer (resident).—R. M. MACKAY, M.D.
Manager.—T. WALDEN HANMER.
Dispenser (resident).—W. LUNNEY.
Matron.—Miss M. SHERWOOD.
Clerk.—A. T. LORD. (On Active Service.)

Land Area and Buildings.

This State Hospital and Asylum is situated about a mile from the Lidcombe railway station, in the Metropolitan District, and the area set apart for the purposes of the institution amounts to about 550 acres. The buildings used for hospital patients and asylum inmates are wholly modelled on the pavilion principle. The whole of the dormitories and buildings used by the patients and inmates are on the ground level. There are thirteen hospital divisions, accommodating 678 patients under active medical treatment and nursing care, in addition to the general dormitories, accommodating 743 asylum cases. The total inmate population of this institution at the close of 1916 was 1,276, as compared with 1,321 on 31st December, 1915.

Admissions and Discharges.

Number in on 1st January, 1916	...	...	...	...	1,321
Admitted during the year ended 31st December, 1916	...	...	...	...	3,458
					<hr/> 4,779
Discharged	...	...	...	...	2,970
Died	...	...	...	...	533
					<hr/> 3,503
Number in on 31st December, 1916	...	...	...	...	1,276
Average daily number of persons in the institution during 1916	...	...	...	...	<hr/>1,352

HOSPITAL DIVISION.

Number of hospital patients 1st January, 1916	...	...	...	642
Admitted during the year	...	...	...	2,661
				<hr/> 3,303
Discharged	...	...	...	2,128
Died	...	...	...	533
				<hr/> 2,661
Remaining in hospital 31st December, 1916	...	...	...	642
Average daily number in hospital during 1916	...	...	...	<hr/>654

Mortality rate, 16·1 per cent.

Total cost of maintenance and treatment of patients
and inmates for 1916, £43,588 5s. 6d.

Average cost per head, £32 4s. 9d.

Decrease in population compared with preceding year ... 45

The Rookwood State Hospital and Asylum is the largest institution of its kind in the Commonwealth, and has accommodation for 1,421 inmates. The average daily population during 1916 was 1,352, and 3,458 persons were admitted during the year.

The

The building accommodation is made up of hospital blocks and asylum or "yard" blocks. Patients on admission who require medical treatment are sent into the wards, whilst those who can be treated as outdoor patients, or require no medical attention, are sent into the "yard" portion of the institution.

Hospital Divisions.—The wards number thirteen, and are directly under the care of the resident medical staff. An attempt at classification within certain limits has been made.

There are two wards, EP1 and EP2, for epileptic and mental cases, with accommodation for 137.

Certifiable cases are transferred to the hospitals for the insane. There were 75 transfers during the year. Certain of the younger epileptics are at work in the garden under supervision.

MEDICAL REPORT FOR THE YEAR ENDED 31st DECEMBER, 1916.

As will be seen from the appended lists, this institution has maintained its usefulness as a General Hospital. During the year transfers of all kinds have been made from various Metropolitan Hospitals, and the number transferred from Country Hospitals was 147 as compared with 142 last year.

The number of cases of phthisis admitted has been as large as in previous years, and extra accommodation for this type of case is urgently required. The same remark applies to the epileptic ward, the resources of this ward having been sorely overtaxed.

The appointment of a third medical officer is also an urgent necessity, the amount of work having largely increased whilst the number of medical officers has remained stationary.

The provisions of a larger and more up to date surgical operating theatre is also a matter deserving attention. The number of surgical cases is an increasing quantity and the present small theatre, especially in the hot weather, leaves much to be desired.

In the opinion of the resident medical officers, the appointment of day charge nurses, or charge attendants in the special male, *e.g.*, wards H. I. skin and epileptic, to each pavilion would lead to greater efficiency in the working of the wards. The present system of rotation is not conducive to that personal interest in and knowledge of the patients which is so essential. Moreover, the continual changing divides the responsibility in each ward. The system advocated is only that followed in all general hospitals and has already been adopted in E. Ward and Chest Ward with distinct advantage.

Dr. W. A. McDonald having been appointed to the position of Medical Superintendent, State Hospital and Asylum, Liverpool, Dr. F. Short was appointed in his place. In November Dr. Short was transferred to the staff of the Coast Hospital, Dr. R. M. Mackay being appointed Assistant Medical Officer in his stead.

Transfers from other hospitals numbering seventy-five patients were certified as insane, and were sent to the Mental Hospital, Rydalmere.

Fifty patients suffering from cancerous or venereal diseases were transferred to Liverpool State Hospital.

Transfers to Prince Alfred Hospital numbered, 2.

Transfers to Macquarie-street Asylum, 15.

Admissions sent by country police, 49.

Transfers to Waterfall Sanatorium, 7.

GENERAL WORK OF THE INSTITUTION UNDER THE CARE OF THE RESIDENT MEDICAL STAFF.

The specialised departments under the care of the Honorary Medical Officers have again reached a high state of efficiency, and special thanks are due to these gentlemen. Tests of sputa, blood, &c., have been carried out by the Microbiological Department, and also the preparation of pathological sections, bacteriological tests, vaccines, &c. Sydney Hospital has undertaken all X-Ray work and also the radium treatment of cases.

As in previous years all new admissions (unless contra-indicated or recently done) have been vaccinated before being transferred to the general hospital wards. This is a prophylactic measure which might well be adopted in all similar institutions.

Lectures on practical nursing were given to nurses from the various institutions.

GENERAL SURGERY.

The Hon. J. B. Nash having returned from service with the army abroad, has resumed his duties as Hon. Surgeon, and his valuable services are always available in cases of emergency.

Dr. A. Miller has again acted as Hon. Anæsthetist and given much of his valuable time to this important work. Dr. McDonagh has also acted during Dr. Miller's unavoidable absence, and his services in such emergencies have been much appreciated.

General Surgery—Major operations	...	...	...	...	214
Minor operations	...	...	...	...	160
Eye Operations (Dr. Pockley)	...	...	...	...	55
Ear, Nose, and Throat (Dr. Dunn)	...	...	...	...	50
Total	...	...	...	...	479

LIST

LIST of Operations.

Amputations.....	8	Papilloma.....	1
Appendicectomy.....	2	Perineal Fistula.....	2
Bone Necrosis.....	5	Perineal Abscess.....	1
Bunions.....	2	Periostitis.....	1
Boring Os Calcis.....	1	Plastic Operation.....	1
Bubonocele.....	1	Rectal Stricture.....	1
Cancer of Tongue.....	1	Stump Repair.....	1
Cervical Glands.....	3	Skin Grafting.....	1
Colotomy.....	3	Sequestrectomy.....	1
Cystoscopy.....	6	Suprapubic cystotomy.....	5
Cysts.....	4	Stretching Sciatic Nerve.....	1
Cut-throat Repair.....	1	Sinus Exploration.....	7
Epithelioma of Lip.....	8	Sarcoma of Leg.....	11
" of Floor Mouth.....	1	Salvarsan Injections.....	3
" of Hand.....	1	Trigeminal Nerve Injection.....	1
Enlarged Prostate.....	1	T. B. Abscesses of Femur.....	2
Empyema.....	2	Urinary Fistula.....	1
Extravasation of Urine.....	1	Urethrotomy, Internal.....	3
Examinations under Anaesthesia.....	3	" External.....	1
Fistula-in-Ano.....	4	Ununited Fracture.....	1
Hæmorrhoids.....	20	Urethral Stricture Dilatation.....	2
Hydrocele.....	5	Ulcers of Tongue.....	2
Herniotomy.....	29	Varicose Veins.....	30
Ischio-rectal Abscess.....	1	Varicocele.....	15
Laparotomy.....	9	Vesical Calculus.....	1
Nephrectomy.....	2	Wound Repair.....	1
Naevus.....	1		
Osteotomy.....	2	Total.....	214

DERMATOLOGICAL DEPARTMENT.

This Department still remains under the direction of Dr. Chas. Ayres, and much excellent work has been done during the past year.

The conditions treated and results are tabulated as follows:—

	Cured.	Relieved.	Died.	Total.
Seborrhoea capitis.....	18	...	...	18
" corporis.....	15	...	...	15
Psoriasis.....	13	...	...	13
Eczema.....	58	...	1	59
" (trade).....	1	...	...	1
Phthiriasis.....	48	...	...	48
Sycosis.....	4	...	...	4
Rodent ulcer.....	5	6	...	11
Specific.....	11	...	...	11
Herpes Zoster.....	7	...	...	7
Pigmented sores.....	1	...	...	1
Pus infection.....	26	...	...	26
Varicose ulcer.....	6	...	...	6
Papilloma.....	2	...	...	2
Acne vulgaris.....	4	...	...	4
" rosacea.....	1	...	...	1
Burns.....	2	...	...	2
Icthyosis.....	2	...	...	2
Epithelioma of face.....	1	4	...	5
Lichen planus.....	1	...	...	1
Scabies.....	6	...	...	6
Cellulitis.....	1	...	...	1
Ulcer of leg.....	7	...	1	8
Folliculitis.....	3	...	...	3
Intertrigo.....	9	...	...	9
Varicose eczema.....	14	...	...	14
Purpura.....	4	...	...	4
Pyogenic infection (legs).....	1	...	...	1
Acute eczema.....	2	...	...	2
Abrasions.....	1	...	...	1
Recklinghausen's disease.....	...	2	...	2
Keloids Multiple.....	...	1	...	1
Vesicular eruptions.....	1	...	...	1
Septic foot.....	4	...	...	4
Tinea circinata.....	1	...	...	1
Papular eczema.....	1	...	...	1
Carcinoma of neck.....	...	1	...	1
Bromide rash.....	1	...	...	1
Raynaud's disease.....	2	...	...	2
Malignant tumour.....	...	1	...	1
Carbuncle.....	1	...	...	1
Dermatitis solare.....	3	...	...	3
" exfoliativa.....	1	...	...	1
	289	15	2	306
Still in ward at 31st December, 1916.....				45
Total.....				351

EAR, NOSE, AND THROAT DEPARTMENT.

Dr. W. A. Dunn has had charge of this Department, and during the year achieved uniformly satisfactory results.

The conditions seen and the operations performed are listed hereunder :—

<i>Nose.</i>		<i>Ear—continued.</i>	
Vestibulitis	3	7th nerve paralysis	1
Perforated septum (idiopathic).....	1	Labyrinthitis	1
Rhinitis—		Foreign body in external meatus.....	3
Chronic.....	3	Perichondritis of ear	1
Hyperplastic.....	2	Dermatitis of pinna.....	1
Syphilitic	2		
Sicca	1	<i>Neck.</i>	
Septal spurs and asthma.....	1	Cut throat.....	1
Nasal polypi.....	4	Cervical cellulitis.....	1
Deflected septum.....	23	Sebaceous cyst.....	1
Fractured nasal bones.....	3		
Ethmoiditis	3	<i>Throat.</i>	
Frontal sinusitis.....	2	Tonsillitis	5
		Quinsy	1
		Tuberculous epiglottis.....	1
		Laryngitis—	
<i>Mouth.</i>		Simple	6
Cleft palate.....	1	Tuberculous.....	9
Gingivitis	2	Pharyngitis	5
„ with cervical adenitis.....	1	Tonsils and adenoids.....	1
Pyorrhœa alveolaris	2	Hyperplasia lingual tonsils	1
		Malignant tonsil.....	1
		Oedema glottidis	1
<i>Ear.</i>			
Mastoiditis	1	<i>Oesophagus.</i>	
Impacted cerumen.....	11	Oesophageal growth	2
Central tinnitus	1	Foreign body in oesophagus.....	1
Nerve deafness.....	7	Oesophageal stricture.....	3
Eustachian mid ear catarrh	3		
Middle ear catarrh	2	<i>Face.</i>	
Otitis media—		Orbital and maxillary cellulitis.....	1
Acute	8	Dislocation malar bone.....	2
Sicca	1	Malignant growth, superior maxilla.....	1
Chronic.....	8	Temporo-maxillary arthritis.....	1
Suppurative.....	2		
OPERATIONS (Dr. W. A. Dunn).			
Tonsils and adenoids	4	Tracheotomy	1
Mastoid	1	Skin grafting	2
Deflected septum.....	7	Laryngoscopy	1
Intubation of larynx	1	Plastic facial.....	4
Polypus removal.....	3	Tonsillectomy	1
Cauterization of tonsil.....	3	Resection of epiglottis.....	1
„ larynx	2	Partial resection of epiglottis.....	1
Rodent ulcer, removal	3	Oesophageal dilatation.....	1
Oesophagoscopy	6	Repair fracture of malar bone.....	1
Excision of neoplasm from mouth.....	1	Excision of epiglottic sebaceous cyst	1
„ „ nose and cheek	1	Turbinectomy	1
„ „ neck	1		
Septal spur.....	2	Total.....	50

DENTAL DEPARTMENT.

The hon. Dentist (Mr. W. J. O'Kane, L.D.S., R.C.S., Eng.), most successfully attended to this Department, and made fourteen visits during the year.

The total number of treatments carried out was three hundred and forty (340).

SUMMARY of Dental Operations.

Extractions	258
Fillings	4
Dressings and Scalings	12
Examinations	65
General Anæsthetic	1
Total	340

MASSAGE DEPARTMENT.

Hon. Masseur—Lieutenant J. BERNARD JOB.

Asst. Masseurs—Messrs. CAMPBELL and EVANS.

Owing to Military duties, Lieutenant Job has not been able to visit more than once a month. We have, most unfortunately, lost the services of Mr. Evans, who has been transferred to the Military Depot. His attendances were very regular and his work of very high quality. The demands on this Department are enormous, and we are quite unable to cope with them; but Mr. Campbell has kindly started to train one of the Staff in order to partially overtake the work. Special thanks are due to the above-named gentlemen for their successful and very arduous labours.

SUMMARY

SUMMARY of Treatments.

Cases carried forward from 1915	18
New cases, 1916	141
Number of treatments given	1,592
Results of Treatment—	
Recovered	70
Relieved	53
Unrelieved	15
Cases carried forward into 1917...	21

OPHTHALMOLOGICAL DEPARTMENT.

Dr. Guy Antill Pockley has, as before, most ably carried out the duties of this Department. This work is very exacting, the number of cases for treatment being very large.

Lids—		Lens—	
Ptosis.....	1	Cataract immature.....	32
Entropion.....	3	„ mature.....	11
Ectropion.....	7	Dislocation of lens.....	3
Trichiasis.....	4	Morgagnian cataract.....	1
Chalazion.....	2		
Symblepharon.....	1	Sclera—	
Blepharitis.....	2	Scleritis.....	1
Rodent ulcer of inner canthus.....	1	Episcleritis.....	1
Trachoma.....	3		
T.B. ulceration, inner canthus.....	1	Retina and choroid—	
Lachrymal apparatus—		Retinal detachment.....	1
Mucocoele.....	1	Choroiditis.....	8
Conjunctiva—		Macular chorioiditis.....	2
Acute conjunctivitis.....	2		
Chronic conjunctivitis.....	19	Optic nerve—	
Pterygium.....	6	Atrophy (primary).....	5
		„ (secondary).....	8
Muscles—		Neuritis.....	2
Total ophthalmoplegia.....	1	Toxic amblyopia.....	3
External ophthalmoplegia.....	1		
Divergent squint.....	1	Globe—	
Cornea—		Phthisis bulbi.....	1
Nebula.....	6	Panophthalmitis.....	1
Macula.....	2	Staphyloma, ciliary.....	1
Leucema.....	6		
Leucema adherens.....	2	Glaucoma—	
Ulcer with hypopyon.....	2	Chronic.....	11
Ulcer.....	6		
Perforated corneal ulcer.....	1	Errors of refraction—	
Anterior staphyloema.....	3	Mycopia.....	10
Keratitis.....	1	„ astigmatism.....	10
Foreign body.....	1	Hypermetropia.....	41
		„ astigmatism.....	1
Iris—		Presbyopia.....	44
Occlusio pupillæ.....	1	Mixed astigmatism.....	1
Iridodonesis.....	4		
Iritis.....	5		
Iris bombe.....	1		
Persistent pupillary membrane.....	2		
		Total conditions.....	291

LIST of Eye Operations during the year 1916.

Cataract—		Glaucoma—	
Extraction with iridectomy.....	17	Iridectomy for acute.....	1
Preliminary iridectomy and operation		Chronic.....	3
for maturation.....	3	Tarsectomy.....	3
Extraction after preliminary iridectomy	3	Trachoma crushing.....	4
Needling.....	8	Excision lachrymal sac.....	1
Operations for entropion.....	3	Iridectomy, optical.....	3
Enucleation.....	3	Paracentesis.....	1
Pterygium.....	4		
		Total.....	57

T. WALDEN HANMER,
Manager.

R. M. MACKAY,
Acting Medical Superintendent.

9.—STATE HOSPITAL AND ASYLUM FOR MEN, LIVERPOOL.

REPORT OF THE MEDICAL SUPERINTENDENT FOR THE YEAR ENDED
31st DECEMBER, 1916.

Administrative Staff.

Medical Superintendent.—J. A. BEATTIE, L.K.Q.C.P., L.R.C.P. (resigned April, 1916): W. A. McDONALD, M.B., Ch.M., appointed 20th Aug., 1916.
Junior Medical Officer.—S. McLENNAN, M.B., M.Ch.
Honorary Surgeon, Ear and Throat.—R. ARTHUR, M.D., M.L.A.
Honorary Ophthalmologist.—E. C. TEMPLE SMITH, M.B., B.S., M.R.C.S., Eng., L.R.C.P., Lon., F.R.C.S., Edin.
Matron.—Miss C. M. BURNE.
Dispenser.—R. C. ROWE.
Manager.—R. J. BROWN.

No. of persons in residence on 1st January, 1916	555
Admitted during year ended 31st December, 1916... ..	1,414
	1,969
Discharged from 1st January, 1916, to 31st December, 1916	1,236
Died from 1st January, 1916, to 31st December, 1916	209
	1,445
Number in residence on 31st December, 1916	524
	564
Average daily number of inmates	564
Percentage of deaths, 12·22.	
Average age of deceased persons, 65·74 years.	
Total cost of maintenance and treatment of patients and inmates, £19,145 17s. 5½d.	
Average cost per head, £33.	

Sir,

I have pleasure in submitting a short review of the work of the Liverpool State Hospital and Asylum for the year 1916.

During this period the Institution, in spite of difficulties occasioned by the continued illness of the Senior Medical Superintendent, and the difficulty in obtaining full time medical officers, owing to the prior demands of the war, maintained its efficiency, and made some progress.

The Staff.

The Senior Medical Superintendent retired in April, after the completion of a long and valuable public career. Of his official career of nearly forty years, thirty were spent in charge of Liverpool State Hospital and Asylum, and the severance was deeply regretted and keenly felt by the Staff and inmates generally.

Dr. McLennan, Junior Medical Officer, who had medical charge on the occasion of Dr. Beattie's illness, enlisted in January, and Dr. Pirie carried on until the appointment of the Medical Superintendent in August.

Another notable change in the personnel of the Staff was caused by Matron Le Jeune entering upon extended leave in September, prior to her retirement. Her retirement in August, 1917, will complete twenty-six and a half years' good and faithful service.

Her successor, Miss C. M. Burne, entered on duty on the 16th November.

There were four enlistments during the year, one of whom, Attendant Edgar Alexander Baxter, made the full sacrifice, having died of wounds on the 4th December.

General Work of the Institution.

The Institution is divided into a General Division with accommodation for 250 inmates not requiring active hospital treatment, and a Hospital Division comprising 11 wards for general medical and surgical cases; a "Lock" Ward, and a Cancer Division.

During the year the hospital accommodation was availed of as follows :—

Occupying beds on 1st January	308
Admitted to 31st December... ..	886
	1,194
Discharges	702
Deaths	209
	911
Remaining under treatment on 31st December, 1916	283

The

The "Lock" ward has accommodation for 37 patients. Special efforts were directed towards the treatment of those in this ward, owing to their being of a class younger than the average patient, and their ailments more amenable to permanent relief. The accommodation was fully taxed during the whole year, occasionally to six above the complement.

Number in the ward on 1st January	21	
Admitted to 31st December... ..	293	
	<hr/>	314
Discharges	277	
Deaths	1	
	<hr/>	278
		<hr/>
		36

Three hundred intravenous injections of Arseno-benzol and Kharsivan were given during the year.

We are indebted to the Microbiological Department for carrying out the "Bordet" tests dealing with these patients.

The Cancer Division is for the reception of and accommodation for treatment of males suffering from inoperable growths, and has space for 35 patients.

Number in the Division on 1st January	46	
Admitted to 31st December... ..	109	
	<hr/>	155
Discharges	46	
Deaths	76	
	<hr/>	122
		<hr/>
Remaining in the Division on 31st December		33

Surgical Report.

Dr. Temple Smith, Honorary Oculist, continued his visits during the year, and treated a large number of patients suffering from ocular troubles. He also performed 23 operations during the same period.

In addition to the general Institutional work, the hospital was able to deal with a number of district cases, admitted for treatment, and it is hoped to develop this side of the Institution's usefulness in the future.

To cope more efficiently with the work and to develop the Institution along the lines of general usefulness, certain alterations to the present structure, and the provision of additional buildings are necessary. The most pressing of proposed new buildings are:—

- (1) Nurses' quarters.
- (2) Extension of dormitory accommodation.
- (3) Provision of an operating theatre.
- (4) Quarters for officers who should be resident.
- (5) Administrative block.
- (6) New mortuary.

The alterations in view are the renovation and equipment of two wards, one male and one female, to serve the needs of the district. This provision would be much appreciated, as the nearest general hospitals are at Parramatta and Camden.

Manager's Review of Outdoor Work.

Material progress has been made during the year in this section. The long contemplated resumption of the lands adjoining the septic tank gardens was effected in May, and since then a considerable area has been cleared, and fenced, and a portion is now under crop. A beginning will shortly be made with the erection of the new piggeries, stables, &c., on this site.

The appointment of a carpenter to the Staff on the 1st September has already proved most advantageous.

The flower gardens and grounds immediately surrounding the hospitals have been well maintained, and the buildings generally kept in good repair.

The vegetable gardens have continued to yield sufficient for our own use; no purchases having been made during the year.

Piggery.

Gratifying results have been shown from our piggery operations. Sales amounting to £2,500 have been effected, and our stock well maintained both in quality and quantity.

Bakery

Bakery.

The bakehouse continued to supply bread of excellent quality. Apart from the added convenience of local supply, a saving on the State Bakery prices of £181 was effected.

Tailors' Shop.

This department was responsible for all repairs, and for the manufacture of the greater part of the inmates' clothing, at a material saving on outside rates.

Boot Shop.

All necessary repairs were effectively carried out and boots made for special cases.

Domestic Work.

The kitchen, laundry, bathrooms, and other services have been efficiently conducted.

Valuable assistance has continued to be given to the Military authorities in their laundry work; our facilities being still placed at their disposal on two days each week.

The saving to the Defence Department by this arrangement is very considerable.

R.J. BROWN,
Manager.

WILLIAM McDONALD,
Medical Superintendent.

10.—STATE HOSPITAL AND ASYLUM FOR WOMEN, NEWINGTON.

REPORT FOR YEAR ENDED 31ST DECEMBER, 1916.

Honorary and Visiting Staff.

Honorary Surgeon.—WALTER ALEXANDER SHARPE, M.B., F.R.C.S.
 Honorary Ophthalmic Surgeon.—GUY ANTILL POCKLEY, M.B.
 Honorary Ear, Throat, and Nose Surgeon.—R. ARTHUR, M.D., M.I.A.
 Honorary Neurologist.—A. DAVIDSON, M.D.
 Visiting Medical Officer.—FRANCIS FURNIVAL, M.R.C.S.

Resident Staff.

Medical Officer.—ETHEL REMFREY MORRIS, M.B., M.Sc.
 Manager.—WILLIAM M. MEGARVEY.
 Matron.—MRS. LETITIA HARDEN.
 Clerk and Storekeeper.—CHARLES G. GROVE.
 Dispenser.—MISS ETHEL M. KIRTON.

There have been no changes in the Medical or Administrative Staff during the year.

Building and Situation.

The State Hospital and Asylum is situated on the southern bank of the Parramatta River, about three miles distant from the Auburn Railway Station.

“Newington House,” now used as the administrative block for the institution, has experienced many changes. It was originally known as Newington Farm, and belonged to the Blaxland family, the property now known as Newington State Hospital, being part of a grant of 1,200 acres made to John Blaxland in May, 1807. Between forty and fifty years ago the property was used as a Boys’ School—the original Newington College—later removed to Stanmore. About 1878 it became necessary to find better accommodation for the old women housed in the Benevolent Asylum at the top of George-street, Sydney, and they were transferred to Newington. Since that date the institution—then known as Newington Asylum—has grown steadily in importance, and now accommodates between 700 and 800 women. About half of these women require hospital treatment, and provision for them at Newington State Hospital greatly relieves congestion at the metropolitan hospitals.

Admissions and Discharges.

The number of persons admitted to the institution during 1916 was slightly lower than in 1915, when the number was 1,300. The number of inmates treated during 1916 is shown in the following table:—

Total number of inmates and patients on 1st January, 1916	...	...	...	...	...	...	749
Admitted during the year ended 31st December, 1916	...	...	...	...	...	...	1,179
							1,928
Total inmates	...	...	...	...	...	...	1,928
Discharged	...	...	...	...	...	...	1,043
Died	...	...	...	...	...	...	181
							1,224
Average daily number of persons resident...	...	...	...	...	...	...	757
Remaining in on 31st December, 1916	...	...	...	...	...	...	704
Total cost of maintenance and treatment of patients and inmates, 1916							
...	...	...	...	...	...	...	£27,935 5 4
Average cost per head	...	...	...	...	...	...	£23 14 9

MEDICAL REPORT FOR YEAR ENDED 31ST DECEMBER, 1916.

Hospital Division.

Patients in hospital, 1st January, 1916	...	...	...	...	...	323
Admitted during the year	...	...	...	...	...	790
						1,113
Discharged during the year	...	...	...	...	...	811
Remaining in hospital, 31st December, 1916	...	...	...	...	...	302
Average daily number of patients in hospital division	...	...	...	...	...	327
Number of patients treated during the year	...	...	...	...	...	1,686
Number of deaths (equal to 10·6 per cent. of cases treated)	...	...	...	...	...	181

This

This year there has been an increase in the number of patients suffering from gonorrhœa and primary and secondary manifestations of syphilis. Of the 113 patients suffering from venereal disease, 57 could be regarded as certainly contagious cases.

The number of patients requiring skilled nursing is steadily increasing, but the number of staff-nurses remains extremely inadequate, and much of the work has been done by untrained, unpaid inmate workers. The treatment received by the patients has therefore not been satisfactory. It also appears impossible to manage for another year without extra accommodation, as the hospital division is now overcrowded, and the number of patients is likely to increase. No additional accommodation for inmates has been provided for over twenty years, and the greatest difficulty is experienced in accommodating new cases arriving daily for hospital treatment. Relief in this direction is a very important matter, as the wards are overcrowded, and new pavilions and day rooms are urgently required.

The nature and number of cases treated in hospital is shown in the following summary :—

(A) IN-PATIENT DIVISION.—Order of Diseases Treated :

I.—General Diseases.		IV.—Respiratory System.	
Senility.....	310	Acute bronchitis	7
Debility	75	Chronic bronchitis	51
Alcoholic debility	42	Asthma	16
Acute rheumatism.....	2	Broncho-pneumonia.....	4
Chronic rheumatism	41	Lobar pneumonia	2
Gout	3	Pleurisy	5
Diabetes.....	2	Tubercular laryngitis	1
Rheumatoid arthritis	7	Pulmonary tuberculosis	30
Syphilis—primary	9	Gangrene of lung.....	1
secondary.....	12	Hæmatemesis	1
tertiary.....	20		
ulcers of leg	36		118
Gonorrhœa—acute	15		
chronic.....	21		
Influenza.....	14		
Obesity.....	2		
Myxodema.....	1		
Tubercular spine.....	2		
Septicæmia	1		
Goitre	1		
	616		
II.—Alimentary System.		V.—Genito-urinary System.	
Pyorrhœa alveolaris.....	1	Chronic nephritis.....	8
Tonsillitis	7	Cystitis	5
Gastritis	37	Dysuria	1
Inanition.....	1	Tumour of kidney	1
Colitis	1	Hæmaturia	1
Chronic constipation	8	Salpingitis	2
Intestinal stasis	1	Menorrhagia	5
Diarrhœa	13	Metrorrhagia	1
Umbilical hernia	4	Dysmenorrhœa	1
Inguinal hernia	1	Carcinoma of vagina	2
Femoral hernia	1	uterus	9
Carcinoma of pylorus.....	1	Prolapse of uterus	2
stomach	2	Granuloma vulvæ.....	1
rectum	4	Pruritis vulvæ	1
Cholecystitis.....	1		40
Intestinal obstruction.....	1		
Cholelithiasis	2		
Enteritis	1		
Gastroenteritis	2		
Hydatid	1		
Fistula in ano	2		
Chronic appendicitis	1		
Cirrhosis of liver	1		
	94		
III.—Circulatory System.		VI.—Nervous System.	
Organic heart disease.....	45	Hemiplegia	21
Endocarditis	2	Paraplegia.....	4
Aortitis.....	2	Paralysis	15
Endarteritis	1	Paresis.....	4
Varicose veins and hæmorrhoids	6	Paralytic stroke	2
Anæmia	18	Cerebral tumour	2
Cerebral hæmorrhage	6	Myelitis	1
Syncope.....	2	Neuralgia	2
	81	Neuritis.....	10
		Sciatica	1
		Paral agitans.....	6
		Locomotor ataxia.....	2
		Chorea	4
		Epilepsy.....	32
		Neurasthenia.....	7
		Hysteria.....	3
		Insomnia	2
		Delirium tremens	1
		Imbecility.....	2
		Fæble-minded	34
		Insanity	7
		Acute mania	3
			165

VII.—*Skin, Cellular Tissues and Glands.*

Simple ulcers.....	39
Varicose ulcers.....	25
Abscesses	6
Carbuncles	5
Furuncle	3
Gangrene	1
Bedsore.....	3
Dermatitis	3
Eczema	16
Erysipelas.....	5
Erythema	1
Erythema nodosum.....	1
Molluscum fibrosum	1
Sebaceous cyst.....	1
Septic seborrhœic cyst on nose.....	1
Seborrhœa capitis	2
Cellulitis of face	1
Lupus of face	1
Psoriasis.....	2
Scabies	3
Verminous	6
Epithelioma of face	1
Carcinoma of throat	1
neck	1
face	1

130

VIII.—*Ossous and Arthritic System.*

Synovitis	2
Septic knee joint.....	1
Talipes	1
<hr/>	
	4

IX.—*Wounds, &c.*

Bruises	9
Burns.....	3
Scalds	1
Sprain	1
Fractures	13
Dislocations	3
Septic wounds	14
Other injuries.....	21
<hr/>	
	65

X.—*Miscellaneous.*

Observation	7
Destitution and neglect	8
Abdominal neoplasm	3
<hr/>	
	18

SUMMARY.—I to X=1331.

OPERATIONS.—Major, 9; Minor, 221.

(B) OUT-PATIENT DIVISION.

During the year 552 patients have been treated. Total number of visits—1,725.

(C) OPHTHALMIC DEPARTMENT.

The cases treated have included refraction, medical and surgical cases. The prevalence of trachoma amongst the asylum patients would justify the setting apart of an isolation ward in which these cases might be treated.

E. R. MORRIS, M.Sc., Melb.,
Resident Medical Officer.

MANAGER'S REPORT ON FARM OPERATIONS.

Fodder produced—Ensilage	60 tons.
Green fodder	75 „
Milk production	46,323 gallons.
Vegetables produced	57,150 lbs.
Farm sales	£896 4s. 4d.
Tallow sales	£250 4s. 2d.

A sand pump dredge has been working here up to the end of November, filling in the old salt pans, about 3 acres, but before the work was quite completed the dredge had to be withdrawn for want of funds.

W. MEGARVEY,
Manager.

11.—STATE ASYLUM FOR AGED AND INFIRM MEN, GEORGE-STREET, PARRAMATTA.

Staff.

Visiting Medical Officer.—DR. W. S. BROWN.

Matron.—MRS. M. PEAKE.

Admissions and Discharges.

Number of inmates in residence on 31st December, 1915	...	189
Admitted during year ended 31st December, 1916	...	730
Total under treatment for 1916		919
Discharged during 1916	...	739
Died during 1916	...	6
		745
Number in residence on 31st December, 1916	...	174
Average daily number of inmates	...	172
Percentage of deaths	...	0.66
Expenditure for the year—£4,116 9s. 7d.		
Average cost per head—£23 18s. 8d.		

Report of Operations for Year 1916.

Work on the electric light system was started 16th October, and completed 27th November.

Demolition of Old Mill Building.—Work in this connection has not yet been started.

The main buildings were whitewashed from time to time. Exterior of buildings and landings painted.

The stone coping around the Institution is being carried on.

Workshops.—Following are the number and value of articles made at the Asylum during the year :—

	£	s.	d.
150 Tweed coats, at 10s. 6d.	78	15	0
9 Serge coats, at 10s. 6d.	4	14	6
111 Tweed vests, at 4s.	22	4	0
58 Tweed trousers, at 7s. 9d.	22	9	6
84 Khaki trousers, at 5s. 6d.	23	2	0
48 Flannel shirts, at 3s. 6d.	8	8	0
72 Flannel drawers, at 3s.	10	16	0
	£170	9	0

The Visiting Medical Officer, Dr. W. S. Brown, visited the Institution on 226 occasions, and attended to 1,531 patients, of whom 133 were transferred to other Institutions for medical treatment.

Regular monthly visits at night were made by the Chief Attendant.

The conduct and discharge of duties by the staff has been satisfactory.

M. PEAKE,
Matron.

12.—STATE ASYLUM FOR THE BLIND, AND FOR MEN SUFFERING FROM DEFECTIVE SIGHT AND SENILITY, MACQUARIE-STREET, PARRAMATTA.

Staff.

Visiting Medical Officer.—DR. W. S. BROWN.

Matron.—MISS MARY CRIMES.

There is very little to add to previous reports. The whole of the buildings—administration portion, dormitories, &c.—have been thoroughly renovated, and are in a very fair state of preservation.

The sewerage and fire services are satisfactory.

Admissions and Discharges.

Number of inmates resident on 31st December, 1915	...	...	170
Admitted during the year	...	...	721
<hr/>			
Total number of inmates for 1916	...	...	891
Discharged during the year	...	...	719
Died during the year...	...	...	4
			<hr/> 723
<hr/>			
Number of inmates on the 31st December, 1916	...	...	168
Decrease compared with previous year	...	...	2
Average daily number	...	...	177
Daily average of blind inmates	...	...	35
Total cost of maintenance—£3,028 8s.			
Average cost per head—£17 2s. 2d.			
Total number of beds and meals supplied to casuals	...	...	716

All inmates' clothing, with the exception of hats and boots, has been made in the institution by inmate labour, at a considerable saving to the Department.

The vegetable garden during the year produced 10,112 lb. of green vegetables.

The bakery has supplied Rookwood Asylum, Newington Asylum, George-street Asylum, Macquarie-street Asylum, and Cottage Homes for Aged Couples with first-class malted white and brown bread. The work has been carried out by two official tradesmen bakers, with the assistance of inmate labour. The following will show the magnitude of the work :—

						lb.
Bread baked during the year	...	...	...	...	...	793,676
Cake baked during the year	...	...	...	...	...	45,320
447½ doz. buns for Easter	...	...	...	...	...	1,006
<hr/>						
Total	...	...	...	...	...	840,002

The principal item, viz., bread, was distributed as follows :—

						lb.
Rookwood Asylum	...	...	...	...	...	447,840
Newington Asylum	...	...	...	...	...	225,396
George-street Asylum	...	...	...	...	...	59,072
Macquarie-street Asylum	...	...	...	...	...	58,432
Cottage Homes for Aged Couples	...	...	...	...	...	2,936
<hr/>						
Total	...	...	...	...	...	793,676

The bread is distributed daily, and cake once a week, to each institution.

General.

The Visiting Medical Officer professionally visited the institution on 302 occasions, during which he saw 1,098 patients, and transferred 98 to other Asylums for hospital treatment. There were not any serious cases of illness, and the deaths (four) were of inmates whose average ages were 79 years.

The Chief Attendant paid monthly night surprise visits, and reported satisfactorily.

The whole of the rations and services to Cottage Homes for Aged Couples were supplied from Macquarie-street Asylum (for an average of six persons being included in the cost of maintenance, £3,028 8s., and statement of expenditure of this institution).

The conduct and services of the staff (clerical and attendants) has been good and entirely satisfactory.

M. CRIMES,
Matron.

REPORT BY THE INSPECTOR OF STATE HOSPITALS AND ASYLUMS REGARDING THE DUTIES CARRIED OUT DURING THE YEAR 1916.

Office of the Director-General of Public Health,
Sydney, 29th December, 1916.

THE following table shows the places visited during the year, and the number of visits in each instance :—

Institution.	Number of Visits.	Remarks.
Macquarie-street, Parramatta.....	30	Auditing cash books and records generally, checking store balances; inspections as to cleanliness and management generally.
George-street, Parramatta.....	19	
Cottage Homes, Parramatta	11	
Newington	19	
Rookwood	41	
Liverpool	25	
Waterfall Sanatorium	5	
Coast Hospital .....	...
Denistone House, Eastwood	12	
Strickland Hospital, Vacluse.....	10	
Lady Edeline Hospital, Vacluse	6	Inquiries.
Berry Hospital .....	...
Metropolitan Hospitals.....	2	

The Coast and David Berry Hospitals were not visited, but considerable assistance was rendered the management from the office. Time has not permitted of visits of inspection being paid to those institutions.

The Manager of the Coast Hospital has, up to the present, been able to carry out a system of audit and inspection of each officer's work; the hospital, however, is about to be enlarged and his duties then will be increased.

The Secretary has paid some visits of inspection to the David Berry Hospital, and attended to the various matters requiring attention.

The average number of visits paid to each institution during the year is between fourteen and fifteen, as against ten for the previous year. More frequent visits were rendered possible owing to the fact that there were no calls from the Ministerial office. However, each place was only visited on an average about once every four weeks, and very rarely indeed was a whole day spent at any one of them. Reasons why more frequent inspections are not made were given in the previous annual report, and consequently need not be repeated here.

The Medical Department at Rookwood has received valuable aid from the honorary staff, while the complete equipment of a Masseur Branch has proved of immense benefit to many patients. This branch has been under the supervision of honorary Masseurs Job, Evans and Campbell; the former two have, however, received appointments in connection with the military, and the whole of the work now devolves upon Mr. Campbell, who specially selected Attendant Wood as his pupil assistant.

Good progress has been made at Liverpool in the Direction of clearing and fencing the land recently resumed for the purpose of enlarging the Institution.

Material for the various buildings, *i.e.*, stables, piggeries, etc., will be supplied from the Cottage Homes, Parramatta, which are about to be demolished, as owing to a dearth of applications they are no longer required.

The Convalescent Hospitals at Vacluse and Eastwood have been admirably managed. The inside staff has rendered all necessary attention to the patients, the diet has been liberal, wholesome and varied, while waste has been reduced to a minimum. The outside duties have been satisfactorily attended to, and a plentiful supply of vegetables, milk, butter, jam, and eggs have been produced at a rate much below what it would have cost the Department to purchase.

A. LAKE.

14.—STATISTICAL SUMMARY.

STATE HOSPITALS AND ASYLUMS FOR THE INFIRM—STATISTICAL TABLES.

No. 1.—RETURN showing the Number of Inmates sheltered and under treatment in the State Hospitals and Asylums during the year ended 31st December, 1916.

	In Asylum 31st December, 1915.		Admitted during the year.		Discharged.		Died.		In Asylum, 31st December, 1916.		
	Men.	Women.	Men.	Women.	Men.	Women.	Men.	Women.	Men.	Women.	Total.
Cottage Homes* .....	...	...	...	...	...	...	...	...	...	...	...
George-street Asylum	189	...	730	...	739	...	6	...	174	...	174
Liverpool State Hospital	555	...	1,414	...	1,236	...	209	...	524	...	524
Macquarie-street Asylum	170	...	721	...	719	...	4	...	168	...	168
Newington State Hospital	80	624	163	1,016	168	875	...	181	80	624	704
Rookwood State Hospital	1,321	...	3,458	...	2,970	...	533	...	1,276	...	1,276
Waterfall Sanatorium	302	121	480	241	393	171	97	61	292	130	422
	2,617	745	6,966	1,257	5,235	1,046	849	342	2,514	754	3,268

* Discontinued as separate Institution from 1st September, 1915.

No. 2.—RETURN showing the Number of Inmates in the State Hospitals and Asylums on the 30th June from 1904–1912; and on 31st December, from 1912–1916.

	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	30th June, 1912.	31st Dec., 1912.	31st Dec., 1913.	31st Dec., 1914.	31st Dec., 1915.	31st Dec., 1916.
Cottage Homes*	43	43	45	42	43	42	35	291	32	32	30	23	*	*
George-street Asylum	951	951	821	782	709	434	249	194	175	245	215	265	189	174
Liverpool State Hospital	863	850	798	714	716	668	628	609	591	550	579	590	555	524
Macquarie-street Asylum	34	298	282	263	260	241	232	169	168	151	149	186	170	168
Newington State Hospital	812	835	797	771	890	755	759	76	741	728	706	732	749	704
Rookwood State Hospital	1,301	1,300	1,316	1,254	1,319	1,434	1,440	1,299	1,272	1,173	1,229	1,328	1,321	1,276
Waterfall Sanatorium .....	...	...	...	...	...	200	217	259	324	351	382	394	423	422
Total	4,289	4,247	4,059	3,826	3,847	3,804	3,590	3,347	3,303	3,230	3,290	3,518	3,407	3,268

* Discontinued as separate Institution from 1st September, 1915.

No. 3.—RETURN showing the Percentages of Deaths, also Average Ages of Deceased Inmates during the year ended 31st December, 1916.

Institution.	Deaths.	Death-rate per 100 persons dealt with.	Average Age.
Cottage Homes* .....	...	...	...
George-street Asylum	6	0.66	71
Liverpool State Hospital	209	12.22	65.74
Macquarie-street Asylum	4	0.44	78.15
Newington State Hospital	181	16.26	61.72
Rookwood State Hospital	533	16.1	64
Waterfall Sanatorium	158	13.8	38.1

* Discontinued as separate Institution from 1st September, 1915.

No. 4.—RETURN showing Ages of Inmates who were in the State Hospitals and Asylums on 31st December, 1916.

Institution.	Under 20 years.	21 to 30.	31 to 40.	41 to 50.	51 to 60.	61 to 70.	71 to 80.	81 to 90.	91 to 100.	Over 100.	Total
Cottage Homes* .....	...	...	...	...	...	...	...	...	...	...	...
George-street Asylum .....	...	1	...	6	32	79	47	9	...	...	174
Liverpool State Hospital	1	20	24	47	114	145	113	56	4	...	524
Macquarie-street Asylum .....	...	...	3	9	31	70	42	9	1	...	168
Newington State Hospital	14	24	51	88	158	177	134	50	8	...	704
Rookwood State Hospital	6	20	86	150	279	381	246	101	7	...	1,276
Waterfall Sanatorium	33	82	89	91	62	55	9	1	...	...	422
Total	54	147	253	391	679	907	591	226	20	...	3,268

* Discontinued as separate Institution from 1st September, 1915.

No. 5.—RETURN showing the Ages of Inmates who Died in the State Hospitals and Asylums during the year ended 31st December, 1916.

Institution.	Under 20.	Under 30.	Above the age of—								Total.
			30.	40.	50.	60.	70.	80.	90.	100.	
Cottage Homes .....	...	...	...	...	...	...	...	...	...	...	...
George-street Asylum .....	...	...	...	...	2	1	...	3	...	...	6
Liverpool State Hospital .....	...	1	9	17	34	61	52	30	4	1	209
Macquarie-street Asylum .....	...	...	...	...	...	...	3	1	...	...	4
Newington State Hospital	2	5	10	13	24	48	37	36	6	...	181
Rookwood State Hospital	3	7	24	53	62	138	167	71	8	...	533
Waterfall Sanatorium	6	45	44	32	21	9	1	...	...	...	158
Total	11	58	87	115	143	257	260	141	18	1	1,091.

No. 6.—DISEASES from which the Inmates who died suffered during the year ended 31st December, 1916.

	Parramatta.			Liverpool.	Newington.	Rookwood.	Waterfall.	Total.
	Cottage Homes.	George-street.	Macquarie-street.					
General Diseases—								
Alcoholism, Acute	1	4	.....	5
Anæmia	2	2	.....	4
Cancer	87	17	19	.....	123
Cystitis	1	.....	14	.....	15
Diabetes, Mellities	1	1	2	.....	3
Gangrene	2	2	.....	4
Gout	1	.....	1
Influenza	1	1	1	.....	3
Miscellaneous	2	1	4	.....	7
Phthisis	3	14	88	157	262
Rheumatism.....	3	.....	.....	3
Rheumatism, Arthritis	3	2	2	.....	7
Syphilis.....	2	.....	2
Lymphadenoma	2	.....	2
Other General Diseases —								
Tuberculosis, Bone Disease	2	.....	2
Tuberculosis, Arthritis	1	.....	1
Cellulitis	1	.....	1
Septicæmia	3	.....	.....	3
Diseases of the Nervous System—								
Cerebral Hemorrhage	2	.....	4	9	15	.....	30
Cerebral Tumour.....	1	.....	.....	1
Chronic Chorea	1	2	.....	3
Dementia	2	.....	2
Epilepsy	2	2	3	.....	7
Desseminated Sclerosis	4	.....	1	.....	5
Hemiplegia	1	.....	.....	5	.....	.....	6
Meningitis, Acute	1	.....	1
Myelitis	1	2	.....	3
Paralysis	2	5	7	.....	14
Paraplegia.....	2	.....	.....	2
Tabes Dorsalis	1	.....	2	.....	3
Diseases of the Circulatory System—								
Aneurism	1	.....	1
Apoplexy	2	.....	2
Cardiac	33	1	79	.....	113
Hodgkin's Disease	1	.....	1
Myocarditis	5	.....	.....	5
Org. Heart Disease	5	.....	.....	5
Endocarditis.....	1	.....	.....	1
Aortitis	1	.....	.....	1
Mitral Disease.....	3	.....	.....	3
Diseases of the Digestive System—								
Peritonitis	1	.....	1
Septic Enteritis	1	.....	1
Cirrhosis	3	.....	4	.....	7
Diarrhœa	2	2	9	.....	13
Intestinal Obstruction	1	.....	.....	1
Non-venereal Diseases of the Genito - urinary System—								
Chronic Nephritis	5	4	34	.....	43
Acute Nephritis	2	.....	2
Senility	3	3	46	66	186	.....	304
Diseases of Respiratory System—								
Asthma	2	.....	.....	.....	2
Bronchitis.....	5	7	15	.....	27
Pneumonia	3	10	.....	13
Pleurisy	1	.....	.....	.....	1
Empyema	1	.....	1
Ill-defined Diseases —								
Inanition	1	.....	.....	1
Exhaustion	1	.....	.....	1
Heart Failure	1	.....	6	.....	.....	7
Violence—								
Accident	4	1	5
Suicide.....	1	.....	1	.....	2
	6	4	209	180	533	158	1,090

* Discontinued as a separate Institution from 1st September, 1915.

No. 7.—NATIONALITY of Inmates sheltered in Asylums on 31st December, 1916.

	Cottage Homes.*	George-street.	Liverpool.	Macquarie-street.	Newington.	Rookwood.	Waterfall.	Total.
New South Wales	23	114	28	285	358	184	992
Other States	4	23	8	39	91	46	214
New Zealand	1	.....	1	5	7	5	19
England	66	159	61	167	338	92	903
Scotland	18	39	20	30	118	24	249
Ireland	59	103	39	154	213	40	583
Wales	6	8	1	4	8	2	29
France	2	6	.....	2	10	2	22
Russia	7	.....	.....	.....	.....	7
Poland	1	.....	1
Sweden	2	3	.....	.....	12	6	23
Norway	1	.....	.....	8	.....	9
Denmark	1	3	.....	1	6	2	13
Switzerland	1	.....	1	1	1	2	6
Italy	3	.....	.....	6	1	10
Spain and Portugal	1	.....	.....	.....	1
Belgium and Holland	2	.....	.....	2	.....	4
Greece	1	1	.....	.....	1	1	4
Austria	1	.....	1
Germany	1	9	2	4	13	6	35
Finland	1	.....	.....	.....	3	1	5
Malta	1	1	.....	.....	.....	1	3
Gibraltar
Channel Islands	2	1	2	4	.....	9
Canada	3	4	2	2	4	1	16
United States of America	1	7	2	1	3	.....	14
West Indies	1	.....	2	2	1	6
South Africa	3	.....	.....	.....	2	5
St. Helena	1	.....	1
India	1	2	1	2	9	1	16
Syria
Asiatic	2	18	.....	1	24	.....	45
Fiji	1	1
Born at Sea	3	.....	2	5	.....	10
Unclassified	2	.....	.....	4	1	7
Total	174	524	168	704	1,276	422	3,268

* Discontinued as a separate Institution from 1st September, 1915.

No. 8.—RETURN showing the number of Inmates in the State Hospitals and Asylums on the 31st December, 1916, who have been resident in this State less than five years.

Institution.	Under 1 year.	Under 2 years.	Under 3 years.	Under 4 years.	Under 5 years.	Total.
*Cottage Homes .....	.....	.....	.....	.....	.....	.....
George-street Asylum	1	2	.....	4	.....	7
Liverpool State Hospital and Asylum	3	7	6	5	3	24
Macquarie-street Asylum .....	.....	1	.....	2	3	6
Newington State Hospital and Asylum	1	2	4	3	1	11
Rookwood State Hospital and Asylum	7	8	9	4	8	36
Waterfall Sanatorium	14	6	12	11	17	60
Total	26	26	31	29	32	144

* Discontinued as a separate Institution from 1st September, 1915.

No. 9.—RETURN showing the ages of Hospital Patients in the different Asylums on 31st December, 1916.

Institution.	Under 21.	20 to 30.	31 to 40.	41 to 50.	51 to 60.	61 to 70.	71 to 80.	81 to 90.	91 to 100.	Over 100.	Total.
*Cottage Homes .....	...	...	...	...	...	...	...	...	...	...	...
George-street Asylum .....	...	...	...	...	...	...	...	...	...	...	...
Liverpool State Hospital and Asylum	1	17	20	22	48	55	66	50	4	...	283
Macquarie-street Asylum .....	...	...	...	...	...	...	...	...	...	...	...
Newington State Hospital and Asylum	6	11	12	41	55	58	74	40	5	...	302
Rookwood State Hospital and Asylum	5	15	57	80	144	135	124	76	6	...	642
Waterfall Sanatorium	32	88	90	79	39	21	2	...	...	...	351
Total	44	131	179	222	286	269	266	166	15	...	1,578

* Discontinued as a separate Institution from 1st September, 1915.

STATE HOSPITALS AND ASYLUMS FOR THE INFIRM.
DETAILED STATEMENT of Expenditure for the year ended 31st December, 1916.

	Parramatta.			Liverpool State Hospital.	Newington State Hospital.	Rookwood State Hospital	Waterfall Sanatorium.	Total.
	Cottage Homes for Aged Couples.*	George-street Asylum.	Macquarie-street Asylum.					
Average daily population.....	172	177	564	757	1,352	430	3,452	
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	
Rations.....	1,846 19 1	6,585 1 9	9,448 14 3	10,162 8 4	23,224 5 0	9,011 0 2	60,278 8 7	
Alcohol and Cordials.....	.....	3 10 5	454 10 3	142 5 6	186 16 11	15 9 8	802 12 9
Drugs	59 3 2	6 14 5	766 6 2	878 5 5	2,128 16 5	310 5 4	4,149 10 11	
Disinfectants	2 19 6	20 18 0	19 0 9	.....	30 9 5	4 0 10	77 8 6
Fuel	87 17 7	220 5 0	653 15 11	700 9 4	2,560 7 4	371 13 10	4,594 9 0	
Light	43 4 1	77 16 1	164 17 3	46 3 2	39 12 7	375 5 0	746 18 2	
Water	129 11 0	115 5 0	189 4 0	3 4 0	254 9 8	252 16 11	944 10 7	
Burials	2 14 6	1 5 0	131 10 1	56 9 6	195 1 0	11 10 0	398 10 1	
Hardware.....	42 2 11	28 3 1	228 16 3	520 7 6	1,122 4 7	138 2 4	2,079 16 8	
Clothing	305 8 10	185 18 6	1,585 2 2	2,073 3 6	2,796 11 7	628 8 11	7,574 13 6	
Fodder	70 8 7	.....	342 16 11	2,292 4 0	1,937 5 7	205 13 8	4,848 8 9
Sundries	41 19 9	214 10 10	385 3 4	96 16 3	147 19 10	45 17 2	932 7 2	
Fowls	64 6 0	.....	.....	.....	61 19 3	.....	126 5 3
Horses and Pigs .....	.....	.....	468 9 0	.....	87 2 0	.....	555 11 0
Salaries and Gratuities	162 9 9	1,816 8 0	7,604 13 7	5,820 16 9	12,892 15 2	4,978 3 9	33,275 7 0	
Salaries and Expenses, Administrative Office	1,157 14 1	.....	.....	.....	.....	1,782 1 6	2,939 15 7
Rent, Repairs, Furniture, Building, Railway Expenses, etc.	125 17 3	118 14 9	1,338 8 3	326 9 3	2,394 18 7	1,082 6 2	5,586 14 3	
Total.....	4,142 16 1	9,394 10 10	23,781 8 2	23,319 2 6	50,060 14 11	19,212 15 3	129,911 7 9	
<i>Add—</i>								
Stock on hand, 31st December, 1915.....	496 19 9	654 8 7	2,509 15 0½	3,162 12 7	2,763 1 5	1,217 17 7	10,804 14 11½	
Adjustment of Exchanges	574 7 4	229 0 9	997 1 7½	1,453 10 3	294 11 2	1,080 19 4	4,629 10 5½	
Grand Total.....	5,214 3 2	10,278 0 2	27,288 4 10	27,935 5 4	53,118 7 6	21,511 12 2	145,345 13 2	
<i>Deduct—</i>								
Stock on hand and Revenue, 31st Dec., 1916	792 11 1	1,229 6 5	8,043 11 4½	8,044 6 4	8,718 3 10	2,673 12 1	29,501 11 1½	
Adjustment of Exchanges	305 2 6	5,020 5 9	98 16 0	1,820 15 5	811 18 2	58 6 7	8,115 4 5	
Total Deductions	1,097 13 7	6,249 12 2	8,142 7 4½	9,865 1 9	9,530 2 0	2,731 18 8	37,616 15 6½	
Net Cost	4,116 9 7	4,028 8 0	19,145 17 5½	18,070 3 7	43,588 5 6	18,779 13 6	107,728 17 7½	
Average Cost per Inmate	23 18 8	22 15 2	33 18 11	23 17 4	32 4 9	43 15 5	31 4 1	

* Discontinued as a separate Institution from 1st September, 1915.

STATE HOSPITALS AND ASYLUMS OF NEW SOUTH WALES.

Chart showing the Variation in the Total Inmate Population each Year since the Year 1890.

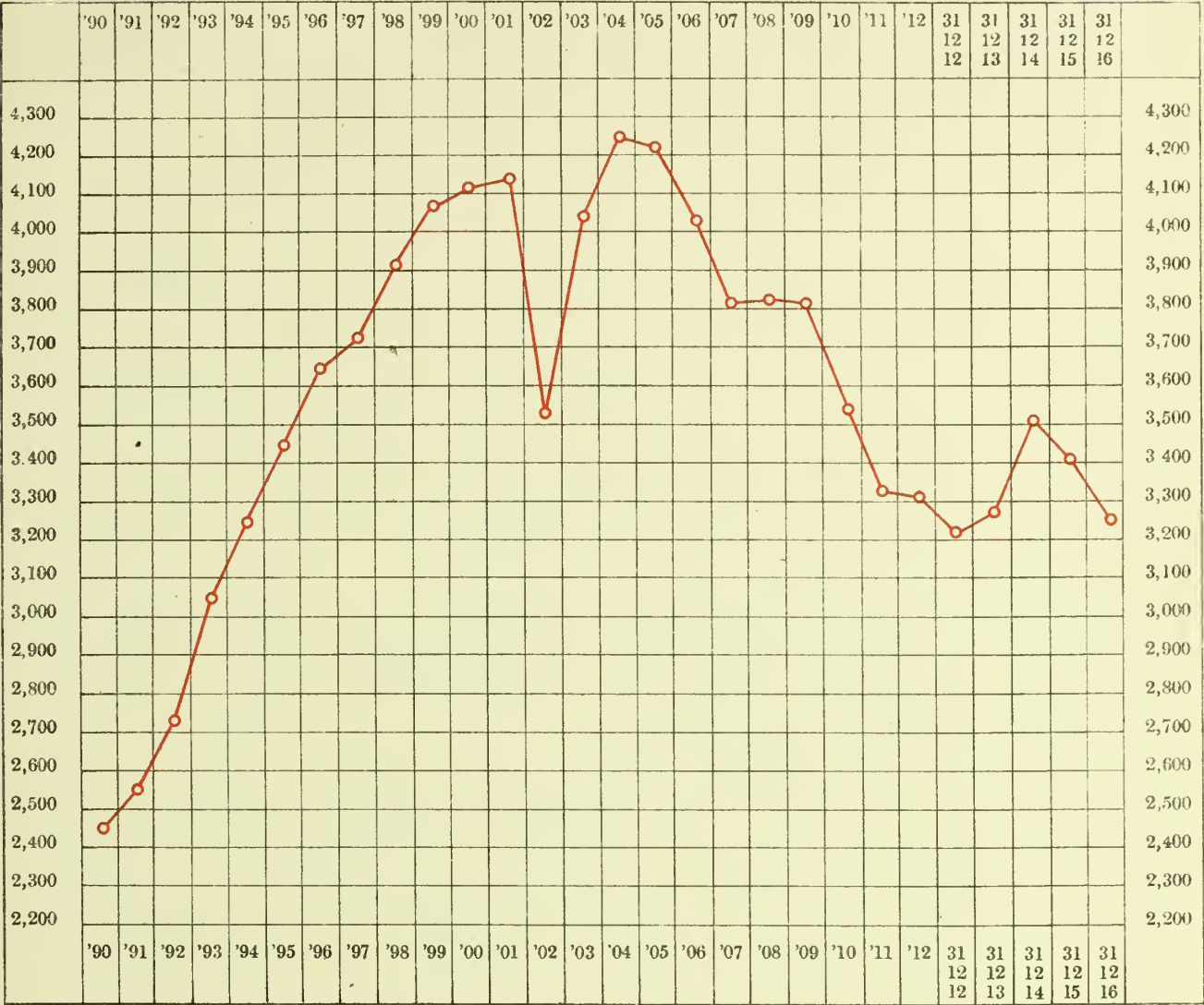
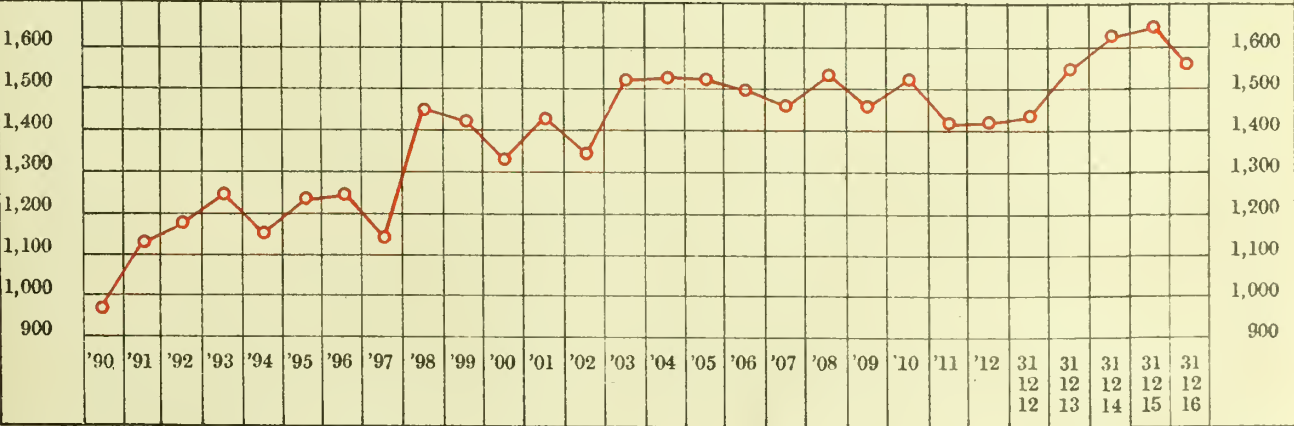


Chart showing the Variation from Year to Year amongst Hospital Patients only.



PART V.

Seventh Report of the Microbiological Laboratory (Government
Bureau of Microbiology) for the year 1916.

PART V.

Seventh Report of the Microbiological Laboratory (Government Bureau of Microbiology) for the year 1916.

The Principal Microbiologist to The Director-General of
Public Health.

Sir,

I have the honor to submit for your information the accompanying report of the Microbiological Laboratory dealing with the work performed during the year 1916.

The progressive increase of work indicated in my report for 1915 continued during 1916. Thus, whilst in 1915, 6,873 microbiological examinations were made, in 1916 the number was 8,407. Pathological examinations—tumours, &c.—have also increased from 549 to 776, whilst the other divisions of our work show corresponding increases, with the exception of the number of rats examined. Whilst this increase of work is in part due to the altered conditions produced by the war, necessitating our making various examinations which during peace time would have been carried out by other workers, a considerable proportion of the increase is due to fuller appreciation of the services that can be rendered by the Microbiological Laboratory in the cure and prevention of disease.

The supply of anti-typhoid vaccine for military purposes was continued as previously, and the protective value of this vaccine appears to have been very satisfactory.

During the whole of the year Dr. E. W. Ferguson, Assistant Microbiologist, and Mr. George Grant, Second Senior Laboratory Assistant, have been away on Active Service. Fortunately, we were able to secure the part-time services of Dr. Burton Bradley, whose previous association with us has proved of the utmost value. Both as regards the professional and laboratory assistant staff, however, the Microbiological Laboratory is seriously undermanned, and is consequently unable to cope—with the staff at its disposal—as efficiently as it should with any sudden emergency. Whilst the condition of war exists, there seems little prospect of remedying this state of affairs, but when peace is attained it will be absolutely necessary in the interests of the community to enlarge our personnel.

It is again a great pleasure to thank the whole staff for their able and cordial co-operation during this time of stress. The clerical staff has maintained its high standard of efficiency, which is especially noteworthy when the highly technical phraseology that has to be employed is considered.

Yours, &c.,

J. BURTON CLELAND,
Principal Microbiologist.

STAFF.

Principal Microbiologist: JOHN BURTON CLELAND, M.D., Ch.M. (Syd.), Cert. Lond. School of Trop. Med., Fellow Roy. Soc. Med., Fellow Incorp. Soc. M.O.H., Fellow of the Society of Tropical Medicine and Hygiene, &c.

Assistant Microbiologists: ECSTACE W. FERGUSON, M.B., Ch.M. (on Active Service); C. H. BURTON BRADLEY, M.B., Ch.M. (Syd.), D.P.H. (Lond.) (temporary); CLIFFORD NORVAL DOUGLAS, 5th year Medical Student (temporary).

Laboratory Assistants: Robert Grant (Senior Assistant), George Gordon Grant (on Active Service), Austin Burton Duffy, John Owen Sergeant, William Alexander Thomson.

Laboratory Attendants: Harry Aldrich Gotto, Neil Maxwell McDonald, Arthur James Williamson.

Clerical Staff: Florence Stuart Wearne, Clerk; Bessie Dobson-Prince, Typiste and Shorthand-writer; Florence Mary Black, Typiste and Shorthand-writer; Annie Vera Matters, Office Assistant; James Flynn, Messenger (on Active Service).

SYNOPSIS.

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PART I.

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PART II.

PART II.
REPORTS OF INVESTIGATIONAL WORK.

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PART I.—ROUTINE WORK.

STATEMENT CONCERNING ROUTINE WORK.

	Nos. of Examinations.
Department of Public Health—	
Microbiological Laboratory	3,771
Coast Hospital	867
Liverpool State Hospital	92
Newington „	26
Rookwood „	1,006
	5,762
Commonwealth Government	1,553
Baby Clinics	1
Department of the Chief Secretary (Fisheries Branch)	17
„ Police	72
„ Prisons	594
„ Railways	36
„ State Children Relief	9
„ Stock	1
„ Stores Supply	25
Public Hospitals and Institutions	1,944
Royal Navy	4
Water Supply and Sewerage Board	300
Zoological Gardens	4
	10,322
Examination of rats for Plague—	
Department of Public Health	1,778
City Council of Sydney	4,761
Sydney Harbour Trust	415
Other sources (chiefly Federal Quarantine Department)	989
	7,943
Total	18,265

Routine Work.

The number of general examinations made (10,322) exceeded by 1,609 those for 1915, when the total was 8,713. The number of rats examined for plague was 7,943, compared with 9,673 in 1915, or a decrease in the specimens submitted of 1,740.

A.—Microbiological Examinations.

1. Of material from diseased persons and animals—		
Acne	45	Mastitis (bovine)
Actinomycosis	3	Meningitis
Anæmia (pernicious)	1	Otitis
Anthrax	6	Plague
Arthritis deformans	1	Pneumonia
Bacilluria, pyelitis and cystitis	91	Pyæmia
Bronchiectasis	17	Pyorrhœa alveolaris
Bronchopneumonia	1	Redwater in cattle
Cellulitis	1	Rheumatoid arthritis
Colitis	1	Rhinitis
Diphtheria	2,663	Septicæmia
Dysentery	1	Septicæmia (puerperal)
Empyema	2	Septic conditions
Favus	1	Syphilis
Furunculosis	45	Tetanus
Gonorrhœa	567	Tinea
Hydatids	17	Tuberculosis
Impetigo	1	Typhoid
Leprosy	16	Unclassified
Malaria	37	
		Total
		8,407

Actinomycosis.—One of these three specimens consisted of an actinomycotic abscess in the submaxillary region of a cow. The second case consisted of lesions in the face of a human being strongly suggestive of actinomycosis; the results were negative. The face was greatly disfigured by extensive tunnelling sinuses discharging watery pus. There was much induration and a reddish discolouration over the bridge of the nose, the sides of the face, neck, &c. The bridge of the nose was depressed, which the patient said was the result of a blow in boxing. There was a strong ozæna smell. Cultures revealed the presence of ordinary pyogenic organisms and a vaccine made from these very greatly ameliorated the condition of the patient. It seems clear, therefore, that there could have been no actinomycotic basis in the case. The third case was pus from the rectum of a youth which also proved negative.

Anthrax.—Specimens from six suspected cases of anthrax in man were submitted. The materials from four cases proved negative. In the case of a typical malignant pustule from the right forearm, which developed in a man employed at a hide and wool store in Sydney, anthrax bacilli were detected. In another specimen diagnosed as a malignant pustule, received from Tamworth in February, microscopic sections showed a number of anthrax bacilli.

Favus.—This consisted of a mouse forwarded from Coonabarabran. There were extensive favus cups on the left side of the head.

Malaria.—A number of blood films were submitted from persons who had returned from malarial districts, and had symptoms suggestive of the possibility of the continuance of a previous malarial infection. In a certain number of cases, the individuals concerned were desirous of enlisting, but having been previously in a malarial district, examination of the blood was required before acceptance. Though examinations in these cases might prove negative, and yet the patient still have a latent infection, these examinations were conducted in the hope that some at least of such infections might be detected. Thirty-two of the total cases proved negative, and five showed the presence of malarial parasites. Of these five cases, one had contracted the disease at Rabaul, New Guinea, eighteen months previously and had been away from the tropics for ten months. A second case contracted his disease in the Solomon Islands; a third, in which crescents were numerous, was infected in the Northern Territory; a fourth case was a woman who received the infection in Malaya—she had been away from a malarial district for four months—whilst there her husband had contracted malaria, but she herself had not manifested any signs of the disease until after she had left the district.

Plague.—Two human cases in which the possibility of plague had to be considered, both proved negative. Clinically also they were not strongly suggestive of this disease.

Tetanus.—Of three cases in which tetanus was suspected, the organism was found and grown from one, the specimen having been taken from a wound in the foot. Tetanus bacilli were not detected in the other two cases.

Tinea.—*Tinea versicolor* was found in the scales from the chest of a patient. In the other case snippings from the nails did not reveal the presence of fungal hyphae.

2. Of Dairy Products:—

Milk.....	2
Cream	1

3. Of Materials, &c.:—

Antisera and Vaccines	49	Disinfectants.....	42
Antisera—Inoculation of Animals	23	Mud for sewage	2
Atropine sulphate.....	1	Test meal	3
Calf lymph	3	Water for organisms	2
Coir matting.....	5	Water (Water Supply and Sewerage Board).....	298
Flock	4		
Rags	2		
Wool, green (for discolouration)	1		435

4. Examinations (biological) for detection of poisons:—

Biscuits.....	1	Mushroom for poisonous properties	1
Condensed	1	Plants, Feeding Experiments with Sus-pected	6
Chemical Base	2	Stomach, Extract from.....	2
Fluid for toxicity	2		

5. Foods for Bacteria:—

Beef, Sirloin of	1	Hop Beer and New Drink	2
Eggs (Chinese), parcels	1	Ling, Sifted	1
Ginger	2	Oysters (parcels)	2

Of Animals:—

Birds	1	Mammals.....	6
Fish	14		

Of Body Fluids, Tissues, &c.:—

Blood (differential count)	49	Tissues:—	
Milk, Human	1	Human	21
Fæces	23	Animal.....	11
Urine.....	315	Tumours:—	
Crystal from urine.....	1	Malignancy.....	121
Cholesterol crystals	1	Non-malignant	295
Gallstones.....	1	Indefinite.....	24
Garden slug coughed up	1		
Urinary calculus	2		776

C.—Examination of Parasites.

Proto-parasites (fleas, ticks, &c.)	555
Endo-parasites (round and flat worms, &c.)	8

D.—Medico-Legal Examinations.

Examination of Exhibits for:—

Blood and Seminal stains	2	Spermatozoa	9
Blood stains	14	Horse's blood	1
Seminal stains	13		

E.—Worm-Nest Investigations.

Examination of Nodules, Flies and Mosquitoes (parcels)	16
--------------------------------------------------------------	----

F.—Dengue Investigation.

Examination of Blood, &c., Dengue Experiments	19
-----------------------------------------------------	----

G.—Other Special Investigations.

Milk, Electrical Experiments with	13
Organisms, Sterilising Experiments with	5

H.—Examination of Kats.

For Department of Public Health	1,778	Other Sources	989
„ City Council	4,761		
„ Sydney Harbour Trust	415		7,943

1. CULTURE MEDIA PREPARED.

Agar: Bile Salt	tubes	500	Brought forward ...	58,588
„ Broth	„	2,209	Litmus peptone water— <i>continued</i> .	
„ Glucose	„	1,464	Galactose	tubes 470
„ Glycerine veal	„	240	Glucose	„ 6,308
„ Nutrient	„	27,080	Inulin	„ 470
„ Gelatine	„	90	Lactose	„ 8,326
Blood Serum	„	18,555	Maltose	„ 710
Dorset's Egg Medium	„	355	Mannite	„ 4,967
Gelatine	„	390	Raffinose	„ 470
Litmus peptone water—			Salicin	„ 470
Adonite	„	470	Saccharose	„ 4,959
Amygdaline	„	470	Sorbite	„ 1,010
Arabinose	„	970	Milk—	
Dextrine	„	420	Litmus	„ 4,909
Dulcitate	„	4,905	Ordinary	„ 4,011
Erythrite	„	470	Nutrient Broth	„ 3,299
		58,588	Peptone water	„ 4,197
			Total ...	103,164

2. CULTURE MEDIA ISSUED.

To whom issued.	Description.	Quantity.
Armidale Hospital	Blood serum	48
Bathurst Hospital	„	18
Cobar Hospital	„	18
Coast Hospital	Agar slopes	132
	Blood serum	10,852
	Broth	9
Commonwealth Government—		
Addison-road Camp	Blood serum	6
Bathurst Camp	„	12
Federal Quarantine Department ...	Agar slopes	4
German Concentration Camp	Blood serum	24
Milson Island	Agar slopes	24
	Blood agar	12
No. 4 A.G. Hospital	Blood serum	3
Rosebery Park Camp	Agar slopes	6
Royal Military College, Duntroon ...	„	6
Victoria Barracks (Garrison Hospital)	„	24
	Blood agar	8
	Blood serum	24
	Broth	2
	Broth swabs	6
	Gentian violet carbol ...	60 e.c.
David Berry Hospital	Blood serum	18
Instruction, Department of Public	„	144
Lewisham Hospital	„	48
Marrickville Cottage Hospital	Broth	2
Mater Misericordiae Hospital	Agar slopes	12
	Blood serum	24
Medical Practitioners	Agar slopes	259
	Blood serum	240
	Broth	5
Newcastle Hospital	Agar slopes	216
	Blood serum	216
Royal Hospital for Women	Agar slopes	6
	Blood agar	1
	Blood serum	6
	Broth	2
St. Vincent's Hospital	Blood serum	12
Tamworth Hospital	Broth	1
Wagga Hospital	Agar slopes	96
	Blood serum	96
Wallsend Hospital	Broth	1
Water Supply and Sewerage Board	Agar slopes	12
Women's Hospital, Crown-street	„	24
	Blood serum	12
	Broth	2
Wyalong Hospital	Blood serum	168
Total		12,921

3. BACTERIOLOGICAL MATERIALS ISSUED.

To whom issued.	Description.	Total.
Armida's Hospital	Swabbings	24
Ba'main Hospital.....	"	186
	Test tubes	12
	Widal pipettes.....	30
Bathurst Hospital	Swabbings	150
	Widal pipettes.....	43
Benevolent Society	Swabbings	12
Berrima Hospital.....	"	36
Cessnock Hospital.....	Widal pipettes.....	12
Colar Hospital.....	Swabbings	18
Commonwealth Government—		
Addison-road Camp	"	6
Bathurst Camp.....	"	12
Federal Quarantine Department ...	"	56
	Widal pipettes.....	36
Garden Island	Swabbings	24
	Test tubes	38
Gorman Concentration Camp.....	Grease pencil	1
	Swabbings	24
	Methylene blue.....	100 c.c.
	Gram's iodine	100 "
	Carbol fuchsine	100 "
H.M.A.S. "Encounter"	Test tubes	24
H.M.A.S. "Tingira"	Swabbings	1,008
Liverpool Field Hospital.....	Carbol fuchsine	100 "
	Grease pencil	1
	Phia's	6
Rosebery Camp	Swabbings	6
Victoria Barracks (Garrison Hospital	Neisser's stain	30 c.c.
	Swabbings	12
	Capillary tubes	50
Dubbo Hospital.....	Swabbings	48
Goulburn Hospital	Widal pipettes.....	30
Instruction, Department of Public.....	Swabbings	36
Junee Hospital.....	"	58
Medical Practitioners.....	"	320
	Rabbits	2
	Small phia's	6
	Widal pipettes.....	70
	Guinea pigs.....	12
National Association for the Prevention		
of Consumption	Sputum bottles	12
Queanbeyan Hospital	Swabbings	60
Railways Department	"	18
Rookwood State Hospital.....	"	12
	Test tubes	36
	Widal pipettes.....	60
State Children Relief Department	Swabbings	24
St. Vincent's Hospital	Guinea pigs	12
Sydney Hospital.....	Swabbings	12
	Rabbits	2
Sydney Medical Mission.....	Swabbings	402
Water Supply and Sewerage Board	Petri dishes	6
	Test tubes	6
Wyalong Hospital	Swabbings	72

4. VACCINES PREPARED AND ISSUED.

Aene (stock)	2	Diphtheroid and coli	1
Anti-typhoid vaccine (215,449 c.c.)	236	" " Gram pos. cocci	1
<i>B. proteus</i>	3	" " Gr. neg. bac. and strep-	
<i>B. pyocyaneus</i>	5	tocoeci	1
Coliform	81	" " micrococci & <i>S. aureus</i> ..	1
Coccal	3	" " <i>S. aureus</i>	1
Cocco-bacilli	1	" " streptococci	1
Diphtheroid	7	Gram neg. bacilli and Gram neg. cocci...	1
Diplococcal	4	Gram pos. cocci & Gram neg. coli bacilli	1
" (pneumococcal type).....	2	<i>M. catarrhalis</i> and Gram neg. bacilli	1
Fluorescent Gram negative bacilli	1	<i>M. catarrhalis</i> and pneumococci.....	1
Mammitis (510 c.c.)	7	Pneumococcal and yeast	1
<i>M. catarrhalis</i>	4	" " Gram negative cocco-	
Micrococcal	6	bac. and coli.....	2
Pneumococcal	14	Staphylococcus and coccus	1
<i>Staphylococcus albus</i>	39	<i>S. aureus</i> and <i>albus</i>	3
" <i>aureus</i>	74	" " streptococcal.....	1
Staphylococcal	4	" " Gram positive diplococci...	1
Streptococcal	29	" " diphtheroid	1
Mixed :—		Streptococci and <i>M. catarrhalis</i>	6
Coli and coccal	4	" " negative bacilli	4
" <i>B. proteus</i>	4	" " micrococci	1
" <i>B. pyocyaneus</i>	1	" " staphylococcal.....	2
" diplococcal	2	" " pneumococcal	2
" micrococci	4	" " diphtheroid and <i>M.</i>	
" <i>M. catarrhalis</i> and staph ..	1	<i>catarrhalis</i>	2
" staphylococcal	2	Stock aene and <i>S. albus</i>	1
" streptococcal & diphtheroids	1	Unknown bacillus	1
" Gr. pos. and Gr. neg. bac.	1	Streptococci, <i>M. catarrhalis</i> and staphy-	
Coccal and diphtheroid.....	1	lococci	1
" streptococcal	1		
<i>B. proteus</i> and staphylococcal	1		
<i>B. pyocyaneus</i> and <i>S. albus</i>	1		
		Total.....	581

5. LACTIC BACTERIA (Butter starters, &c.) ISSUED

To whom issued.	Quantity.
Arthur, Dr. R.	1 bottle.
Berry Stud Farm	10 bottles
Burgess, Dr., Wagga.....	7 "
Cameron, J., Llangothlin	8 "
Coast Hospital	164 "
Colman, H. O., Guyra	4 "
Commonwealth Government—Milson Island	9 "
Cook, Professor	79 "
Deakin, Dr.	17 "
Gallagher, R., Guyra	7 "
Gillies, Dr. Sinclair	30 "
Handebo, T. C., Llangothlin	4 "
Harcombe, Mrs.....	1 bott c.
Hill, Dr.....	19 bottles
Hillingworth, Nelson.....	7 "
McEacharn, J. F. (Stock Department)	2 "
Moore, Giles, Guyra	4 "
Saw, Dr., Perth, Western Australia	9 "
Spendely, H. S., Epping	33 "

6. OTHER CULTURES AND SERA ISSUED.

To whom issued.	Description.
Adelaide Hospital	Cultures of Asiatic cholera and <i>B. paratyphosus</i> A. and B.
Commonwealth Government— Captain Inglis, A.A.M.C.	Cultures of <i>B. paratyphosus</i> A. and B., L.I.P.M. Antisera.
Federal Quarantine Department	Swabbings infected with <i>S. aureus</i> and Klebs. Löffler bacillus.
No. 4 Australian General Hos- pital.	Cultures of <i>B. paratyphosus</i> A. and B.; and <i>B. typhosus</i> .
De Merie, Ltd.	Cultures of <i>B. coli</i> Escherich, and <i>B. typhosus</i> .
Health Department, Queensland	Cultures of <i>B. paratyphosus</i> A. and B.; <i>B.</i> <i>tuberculosis</i> , Human and Bovine.
Johnson, Dr., Angas, South Aus- tralia.	Sterilised cultures of <i>Staphylococcus pyogenes</i> <i>citreus</i> , <i>pyogenes albus</i> , and <i>pyogenes aureus</i> ; <i>Streptococcus pyogenes</i> ; <i>B. anthracis</i> ; Asiatic cholera; <i>B. prodigiosus</i> ; <i>B.</i> <i>pyocyaneus</i> ; <i>B. subtilis</i> ; <i>B. tuberculosis</i> <i>hominis</i> ; <i>B. typhosus</i> ; and <i>B. visceræ</i> .
Jones, Dr., Port Darwin.....	Cultures of Paratyphoid A. and B.; and <i>Typhoid</i> (2 strains).
St. Vincent's Hospital	Cultures of <i>B. paratyphosus</i> A. and B.; and <i>B. typhosus</i> .
Sydney Hospital	Cultures of <i>B. paratyphosus</i> A. and B.
Wallas, Mr. T. I.	Cultures of <i>B. coli</i> Esch. and Enm.

PART II.—REPORTS OF INVESTIGATIONAL WORK.

DIVISION I.—Infective Diseases of Animals (including Man).

1. RESEARCHES ON PLAGUE.

(J. B. Cleland.)

In connection with routine measures taken for the detection of the presence of plague and the prevention of its spread, 7,943 rats and mice were examined during 1916. Plague was not found in any of the specimens. The last plague infected rat was found at Sydney in April, 1910.

ECTO-PARASITES COLLECTED FROM RODENTS.

	No. of Rodents examined.	No. infected with plague.	Insecta.								
			Diptera Siphonaptera (Fleas).						Hemiptera.		
			<i>Leptopyssylla cheopis.</i>	<i>Ctenopyssylla musculi.</i>	<i>Ceratophyllus fasciatus.</i>	<i>Ctenocephalus canis and felis.</i>	<i>Pulex irritans.</i>	Total Fleas.	<i>Hæmatopinus</i> , etc. (Lice).	Very small Acarids (Mites).	Ixodide.
1916.											
8 Jan.	201	...	3	2	...	...	...	5	...	...	...
15 Jan.	153	...	6	...	1	...	...	7	...	...	...
22 Jan.	172	...	14	5	...	1	...	20	2	1	...
29 Jan.	149	...	50	4	3	3	...	60	...	2	...
5 Feb.	171	...	1	2	10	1	...	14	...	...	...
12 Feb.	161	...	6	1	4	...	...	11	...	...	...
19 Feb.	216	...	54	8	16	2	...	80	...	...	...
26 Feb.	277	...	59	1	...	...	...	60	...	...	...
4 Mar.	155	...	25	16	...	...	...	41	...	...	...
11 Mar.	151	...	...	...	...	...	...	...	...	...	...
18 Mar.	156	...	3	...	13	...	...	16	...	...	...
25 Mar.	122	...	15	1	...	...	...	16	...	...	...
1 April	255	...	8	10	9	...	...	27	...	...	...
8 April	198	...	1	...	...	...	...	1	...	...	...
15 April	165	...	...	...	...	...	...	...	...	...	...
22 April	89	...	...	...	...	...	...	...	...	...	...
29 April	127	...	...	...	...	...	...	...	...	...	...
6 May	173	...	5	12	...	...	...	17	...	1	...
13 May	199	...	...	...	...	...	...	...	...	...	...
20 May	175	...	...	...	...	...	...	...	...	...	...
27 May	162	...	11	1	...	...	...	12	...	...	...
3 June	194	...	3	...	...	...	...	3	...	...	...
10 June	114	...	...	...	...	...	...	...	...	...	...
17 June	126	...	...	...	...	...	...	...	...	...	...
24 June	175	...	...	...	...	...	...	...	...	...	...
1 July	159	...	...	...	...	...	...	...	...	...	...
8 July	201	...	26	10	8	...	...	44	...	...	...
15 July	168	...	...	...	...	...	...	...	...	...	...
22 July	163	...	...	...	...	...	...	...	...	...	...
29 July	159	...	...	...	...	...	...	...	...	...	...
5 Aug.	166	...	...	...	...	...	...	...	...	...	...
12 Aug.	170	...	...	...	...	...	...	...	...	...	...
19 Aug.	157	...	...	...	...	...	...	...	...	8	...
26 Aug.	163	...	...	...	...	...	...	...	...	...	...
2 Sept.	169	...	3	8	5	1	...	17	...	8	...
9 Sept.	206	...	4	3	1	...	...	8	...	...	...
16 Sept.	125	...	...	...	...	...	...	...	...	...	...
23 Sept.	78	...	...	...	...	...	...	...	...	...	...
30 Sept.	143	...	...	...	...	...	...	...	...	...	...
7 Oct.	145	...	...	...	...	...	...	...	...	...	...
14 Oct.	101	...	...	...	...	...	...	...	...	...	...
21 Oct.	118	...	...	...	...	...	...	...	...	...	...
28 Oct.	117	...	...	...	...	...	...	...	...	...	...
4 Nov.	114	...	1	6	1	...	...	8	...	...	...
11 Nov.	110	...	1	13	5	...	...	19	...	...	...
18 Nov.	102	...	1	...	...	...	...	1	...	...	...
25 Nov.	115	...	...	...	...	...	...	...	...	...	...
2 Dec.	124	...	...	...	...	...	...	...	...	...	...
9 Dec.	112	...	...	...	...	...	...	...	...	...	...
16 Dec.	114	...	...	...	...	...	...	...	...	...	...
23 Dec.	99	...	...	5	...	...	...	5	...	...	...
30 Dec.	23	...	...	...	...	...	...	...	...	...	...
Year ending 30 Dec.	7,943	...	300	108	76	8	...	492	2	20	...

Species of *Filcas*. 5

The fleas collected were determined as belonging to four species—*Xenopsylla* (*Lamopsylla*) *cheekis*, *Ctenopsylla* *musculi*, *Ceratophyllus* *fasciatus*, and *Ctenocephallus* *felis* (or *canis*.)

Number and Seasonal Prevalence of Fleas.

In the following statement the figures referring to the three principal species of rat-flies collected each month are given in gross, and also expressed as a ratio per 1,000 rats examined. The same data have also been plotted upon the accompanying chart.

Months.	Cases in human beings.	No. of rodents examined.	No. infected with lague.	Lamprosylla chicopsis.		Ctenopsylla museuli.		Ceratophyllus fasciatus.	
				Gross.	per 1,000 rats.	Gross.	per 1,000 rats.	Gross.	per 1,000 rats.
1916.									
January	...	720	.....	73	101.38	11	15.27	4	5.55
February	...	356	.....	120	140.18	12	14.18	30	35.04
March	...	712	.....	43	60.39	17	23.87	13	18.25
April	...	600	.....	9	15.	10	16.66	9	15.
May	...	835	.....	16	19.16	13	15.56	.....	.....
June	...	625	.....	3	4.8	.....	.....	.....	.....
July	...	744	.....	26	34.94	10	13.45	8	10.75
August	...	748	.....	.....	.....	.....	.....	.....	.....
September	...	593	.....	7	11.75	11	18.54	6	10.11
October	...	515	.....	.....	.....	.....	.....	.....	.....
November	...	498	.....	3	6.02	19	38.15	6	16.06
December	...	497	.....	.....	.....	5	10.06	.....	.....

Examination of Rats.

The report of a second outbreak of Plague at Sydney, 1902, (p. 65), contains the following statement referring to all rats examined during the first and second outbreaks of plague in 1900 and 1902 respectively—"All the rats received belonged to one of two species—*Mus decumanus* and *Mus rattus*. No record was kept of the actual number of each. In the whole collection there were about as many of one as of the other; but *Mus rattus* predominated among those taken along the shores, and *Mus decumanus* among those taken inland. The infected specimens were all *Mus decumanus*."

Particulars of all rats subsequently examined are contained in the following table:—

Year.	Period of Rat Examination.	Rats examined.				Mice examined.			Infected							Percentage of infected to total examined.		
		Decumanus.	Per cent.	Rattus.	Per cent.	Musculus.	Per cent.	Total.	Decumanus.	Per cent.	Rattus.	Per cent.	Musculus.	Per cent.	Total.	D.	R.	M.
				1900—First plague outbreak, January 19 to August 9. 1901—2—Secnd plague outbreak, November 12, 1901, to June 8, 1902.														
1903	1st May to 15th Aug.	rats. 8,695	...	...	...	5,976	...	14,671	rats. 111	...	...	...	mice. 50	...	161	...	...	...
1904	1st Mar. to 3rd Dec.	12,169	27·76	8,225	18·76	23,428	53·48	43,822	103	44·26	73	29·92	62	25·41	243	·76	1·16	0·26
1905	Year.	11,383	53·72	5,681	17·81	14,831	46·47	31,895	78	55·32	45	31·91	18	12·77	141	·79	·88	·13
1906	"	9,275	31·49	8,694	23·52	11,478	38·97	29,447	46	26·44	89	51·15	39	22·41	174	·49	1·02	·34
1907	"	8,628	27·2	10,479	33·9	12,244	38·7	31,621	57	26·03	143	65·29	19	8·68	219	·66	1·3	·15
1908	"	7,622	28·39	9,207	34·29	10,020	37·32	26,819	82	45·86	78	44·57	15	8·57	175	1·075	·84	·14
1909	"	6,752	25·26	11,259	42·03	8,726	32·66	26,737	22	12·36	138	77·53	18	10·11	178	·32	1·22	2·06
1910	"	5,708	24·98	10,076	44·15	7,044	30·87	22,821	4	80·	1	20·	...	...	5	·07	·009	...
1911	"	6,025	26·45	10,830	47·15	5,919	26·	22,774	...	...	...	...	...	...	...	...	...	...
1912	"	6,510	37·82	7,922	46·18	2,722	16·	17,154	...	...	...	...	...	...	...	...	...	...
*1913	"	5,020	47·29	5,477	51·59	118	1·1	10,615	...	...	...	...	...	...	...	...	...	...
1914	"	3,732	39·13	5,487	58·14	220	2·33	9,439	...	...	...	...	...	...	...	...	...	...
1915	"	3,592	37·13	5,946	61·48	135	1·39	9,673	...	...	...	...	...	...	...	...	...	...
1916	"	2,807	35·33	4,667	62·13	167	2·1	7,943	...	...	...	...	...	...	...	...	...	...
Total	.....	89,216	30·68	104,520	35·94	97,052	33·37	290,710	397	34·98	567	49·96	171	15·06	1,135	·64	0·88	·19

* Examination of rodents was suspended during the months of August, September, and October, owing to an outbreak of smallpox.

2. TYPHOID FEVER.

(a) ROUTINE EXAMINATION OF SPECIMENS.

(C. N. DOUGLAS.)

1. *Widal (Agglutination) Reactions.*

This reaction was performed on 718 specimens of blood from 700 different cases during the year. Of this number 211 were complete positives, while 36 showed strong, but not quite complete, agglutination. Taking these two results together the percentage of positive results to the total number of specimens examined was 34.3 per cent.

The results have been tabulated and the percentages of positives worked out for each month, to give an indication of the prevalence of cases of enteric fever during each month. The percentage results are, however, not a true indication, as they depend on the total number of specimens sent in for examination. In the summer the likelihood of enteric fever is kept more in mind than during the winter, when only in fairly definite cases are specimens taken to confirm the diagnosis. Taking the actual number of positive results, the case incidence is highest during the months of January, February, March, and April, in that order of ascent from 41 per cent. in January to 46 per cent. in February, and 47 per cent. in March, culminating in 51 per cent. in April, whilst there is a sudden drop to 22.5 per cent. in May, which figures were approximately maintained during the succeeding autumn, winter, and spring months.

In a number of cases, when the diagnosis was obscure, the reaction was repeated, generally after a week's interval. As a routine procedure, when the result was incomplete, a fresh specimen was asked for—in many cases these were not forwarded. The results of these re-examinations are shown in Table II.

In addition, three specimens were received, one of which did not contain sufficient blood to enable an examination to be performed, and the other two arrived in one box with no marks for identification. Examinations were not performed.

Amongst the cases mentioned above, agglutination reactions were performed on *B. paratyphosus A* and *B* in addition to *B. typhosus* in 49 cases. As indicated in Table III, 24 cases gave negative reactions to the 3 organisms; 14 were positive to *B. typhosus*, and negative in the 2 others; 7 were positive to *B. typhosus* and *B. paratyphosus B* only; 3 were positive to all 3 organisms; and 1 was positive in dilutions of 1 in 10, 1 in 30, and 1 in 60 to *B. paratyphosus B*, but negative to *B. typhosus* and *B. paratyphosus A*. In many of the cases in which reactions were given with *B. paratyphosus A* and *B* in addition to *B. typhosus*, the reaction was less marked in the dilution used (1 in 60) with *B. paratyphosus B*, and still less marked with *B. paratyphosus A*. It would, therefore, appear that in all these cases the reactions given by *B. paratyphosus A* and *B* were probably group reactions met with in the course of typhoid fever. In only one instance is it probable that the case was really one of paratyphoid fever, and that was of the *B* variety. Apparently, therefore, so far we have no evidence that paratyphoid fever is endemic in Australia, or that some cases diagnosed as typhoid fever are really instances of this disease. Occasionally sporadic cases do undoubtedly occur. This matter is worth much fuller investigation, as unquestionably the data in our possession are too small to allow of anything beyond a somewhat vague generalisation.

In the case of agglutination reactions with *B. paratyphosus A* we first used dilutions of 1 in 60, but later in the year, owing to the agglutinating titre of this organism being often low, we instituted a dilution of 1 in 10 for routine purposes.

2. *Cultures.*

Cultures were made from urine, faeces, blood, water, milk, pus, &c., and *B. typhosus* searched for as follows:—

Urine.—Seventeen routine specimens were examined, with one positive and twelve negative results. From one specimen an organism was isolated which gave the positive sugar reactions, but did not agglutinate the stock vaccines. From three specimens no growth was obtained. Thirteen military cases were all negatives.

Faeces.—Twenty-one routine specimens were examined. *B. typhosus* was detected in one case, on 30th November, the blood from which gave a negative widal reaction on 27th November, and a positive one on 14th December. Three of the above specimens were also examined for *B. paratyphosus A* and *B*, giving negative results in each case. In 32 military cases, no *B. typhosus* or *B. paratyphosus B* were detected. In one an organism giving the biochemical reactions of *B. paratyphosus A* was isolated—this gave imperfect agglutination at 1 in 60 with the only *B. paratyphosus A* serum available, which was of unsatisfactory titre, even against stock cultures, and it gave a negative reaction at 1 in 60 with *B. paratyphosus B* serum.

Drainages from Gall-bladders.—Two specimens from the same case were examined at an interval of fourteen days. The first specimen yielded an organism in its sugar reactions like *B. typhosus*, but of doubtful agglutinability. The second specimen failed to yield *B. typhosus*. The patient gave no history or symptoms of typhoid fever.

Milk.—One specimen was examined. *B. typhosus* was not found.

Blood.—One broth blood culture was examined, the result being negative. A widal reaction from the same case was also negative.

Material from Abscess (bone, &c.).—A specimen was received in formalin. No organisms were detected.

Domestic Fly.—Cultures made from this specimen were over-grown with *B. proteus*, so that no search could be made for *B. typhosus*.

TABLE

TABLE I.—Result of Widal Examinations.]
CASES examined once only.

Month.	Positive.	Incomplete positive.	Percentage of positive and incomplete positive.	Negative.	Total number of cases.	Total number of examinations.
January	29	9	41·7	53	91	91
February	41	8	46·2	57	106	106
March	39	3	47·2	47	85	89
April	34	1	51·4	33	66	68
May	11	1	22·6	41	51	53
June	9	2	23·9	35	45	46
July	10	6	31·3	35	48	51
August	6	1	20·6	27	34	34
September	3	3	21·4	22	28	28
October	8	...	21·	29	38	38
November	10	2	22·2	42	54	54
December	12	...	20·	48	54	60
	211	36	34·3	470	700	718

TABLE II.
CASES examined more than once.

Cases examined more than once.	Positive.	Incomplete positive.	Negative.	Total number of cases.	Total number of examinations.
Cases examined twice, giving same results on each occasion.	2	...	20	11	22
Cases examined twice, giving different results on different occasions :— 1st. 2nd. - or + - + (one - ve).	4	2	4	5	10
Cases examined three times, giving different results :— 1st. 2nd. 3rd. + - - +	1	1	1	1	3
Cases examined four times, giving different results :— 1st. 2nd. 3rd. 4th. - - - +	1	...	3	1	4
	8	3	28	18	39

+ = Positive. + - = Incomplete positive. - = Negative.

TABLE III.
RESULT of Paratyphoid Examinations.

Of 49 cases here tabled 1-24 in a dilution of 1-60 were negative to *B. typhosus*, *B. paratyphosus A* and *B.*
14 " " positive to *B. typhosus* but negative to *B. paratyphosus A* and *B. paratyphosus B.*
7 " " positive to *B. typhosus* and *B. paratyphosus B.*, and negative to *B. paratyphosus A.*
3 " " positive to *B. typhosus*, *B. paratyphosus B.* and *B. paratyphosus A.*
1 in dilutions of 1-10, 1-30 and 1-60 was positive to *B. paratyphosus B.* but negative to *B. typhosus* and *B. paratyphosus A.*

Month.	Positive.	Incomplete positive.	Negative.	Total number of cases.	Total number of examinations.
January	(a) ... (b) 1	... 1	5 3	5	9
February	(a) ... (b) 1	... 1	8 8	10	20
March	(a) ... (b) 1	... ...	7 6	7	14
April	(a) 1 (b) 1	... 2	8 6	9	18
May	(a) ... (b) ...	... ...	7 7	7	14
June	(a) ... (b) ...	... ...	1 1	1	2
July	(a) ... (b) ...	... ...	1 1	1	2
August	(a) ... (b) ...	... ...	2 2	2	4
September	(a) ... (b) ...	... ...	... ...	...	...
October	(a) ... (b) ...	... ...	2 2	2	4
November	(a) ... (b) 1	... 1	... 3	2	4
December	(a) ... (b) ...	1 ...	3 3	4	8
	(a) 1 (b) 5	3 6	46 39	49	96

(a) = *B. paratyphosus A.* (b) = *B. paratyphosus B.*

(b)

b.) NOTE ON A TYPHOID CARRIER WITH LARGE NUMBERS OF *B. TYPHOSUS* (?) IN THE STOOLS FOR SEVERAL YEARS.

B. BRADLEY.

Although this case has not been the subject of complete bacteriological and other investigations, the short notes collected from numerous routine examinations conducted in the laboratory, are interesting from several points of view.

The case first came under our notice in January, 1915. He was a patient in one of the Mental Hospitals. At this institution there had been a small outbreak of typhoid fever and the present case, a male, aged 53, was suspected and found to be a carrier. There was a history of typhoid fever seven years before.

He was transferred to the Coast Hospital and during the subsequent three years his stools have been submitted for examination fifty-six times. Except on one occasion when no *B. typhosus* was found, possibly due to some other organisms overgrowing the plates, *B. typhosus* has always been present in large numbers.

From the subjoined table it will be seen that we have not always fully tested the organism relying on the extremely characteristic fine "blue" colonies on agar plates, but that periodically these colonies have been more or less fully tested and when so tested always gave the reactions of *B. typhosus*.*

It will be seen that the culture when first isolated by us from this case produced acid only on glucose mannite, sorbite, and litmus peptone water, and produced no change on dulcitol, lactose, cane sugar, and arabinose, and produced also slight acid on milk and gave a negative indol test. These reactions were read after four days' incubation. The cultures subsequently obtained whenever tested gave similar reactions although not always tested so completely.

The urine of this case tested on one occasion contained no *B. typhosus*.

With the kind co-operation of Dr. Wallace, the Acting Medical Superintendent of the Coast Hospital, it was decided to make an endeavour, by therapeutic means, to diminish or eliminate the number of typhoid organisms excreted in the faeces of this patient. With this object in view various drugs were administered, and milk, soured with lactic bacilli (butter starters) administered in the diet. The drugs tried were hexamin, mercury, and betanaphthol with bismuth salicylate. In no instance did the various courses of treatment appear to have any effect on the number of typhoid colonies present.

Hexamin.—Though this drug is only supposed to liberate formaldehyde in an acid medium, and therefore would not be expected to be active in the presence of alkaline bile, it was, nevertheless, tried on the off chance of meeting with conditions under which it might be operative. From 29th January, 1915, to 15th May, 1915—a period of about three and a half months—5 grains were administered three times a day. The drug was discontinued until 10th September, 1917, when a course of 15 grains four-hourly was again instituted.

Mercury.—As mercury is a colagogue purgative it was thought that, if it was administered over a period of time in doses approximating as nearly as possible to the amount that would lead to salivation, but without actually reaching this limit, it might be excreted in the bile in sufficient concentration to exert a deleterious effect upon the typhoid bacilli present. It was presumed that in this case in all probability the gall-bladder formed a reservoir for the typhoid organisms, and thus kept up the number of typhoid bacilli found in the faeces. With this object in view, one-sixth of a grain of calomel was given three times a day from 29th January, 1915, to 15th May, 1915. The same dose was given again from 31st May, 1915, to 9th June, 1915, and from 11th August, 1915, to 13th September, 1915; $\frac{1}{2}$ grain three times a day was administered from 4th November, 1916, to 6th January, 1917. From 9th June, 1915, to 26th June, 1915, a mixture containing liq. hydrarg. perchlor. 1 grm., and quin. sulph., acid sulph. dil. and aqua chloroformi ad. 4 ozs. was given, the dose being $\frac{1}{2}$ oz. three times a day.

Betanaphthol and bismuth salicylate.—From 12th August, 1915, to 4th November, 1916, a powder consisting of 10 grains of each of these drugs was administered three times a day.

Sour milk (Lactic acid bacilli).—The alleged properties of milk soured by lactic acid bacilli in controlling bacterial processes in the intestine suggested its application to the present case. A 6 oz. medicine bottle full was given daily for about six weeks from 3rd March, 1915, and it was administered again for a few weeks from 26th June, 1915.

Agglutination reactions have been performed with the cultures and with the blood of this case on several occasions, but as we intend to investigate this matter fully it will not be discussed in detail here. It will be sufficient to say that so far they are most contradictory, as will be seen from the table.

The principal interest in the present communication is found :—

1. In the persistent and constant presence in the stools of a bacillus closely resembling, if not identical with, *B. typhosus*.
2. In the fact that the typhoid bacilli usually outnumber, and often greatly outnumber, the colon bacilli.
3. The apparent long duration of the carrier condition.

The patient physically enjoys the best of health and is a voracious feeder.

* The agglutination reaction was atypical, see Table, p. 179.

TABLE OF EXAMINATIONS MADE.

Date.	Specimen.	Agar Plate Numbers represent Approximate Proportions of the respective Colonies.		No. of Colonies picked off for Testing.	No. of sub-cultures negative on lactose.	Remarks and Notes.
		Typhoid.	Coli.			
1915.						
15 Jan. ...	Letter .....	.. ..	.....	.....	.....	States patient has had typhoid fever 7 years ago.
2 Feb. ...	Fæces .....	.....	.....	12	6	*G., M., D., L., S., Sorb., Arab., Indol., Milk. A. A. - - - A. - - - A.
	Fæces after purge.	.....	.....	12	6	Tested on 7/4/15. Agglutination negative, 1 in 60, 1 hour, with 2 positive Widal bloods. Tested on 7/4/15. Agglutination negative, 1 in 60, 1 hour, with 2 positive Widal bloods.
23 „ ...	Fæces .....	.....	.....	12	10	Reacts as above (milk not tested). Tested on 7/4/15. Agglutination negative, 1 in 60, 1 hour, with 1 positive Widal blood.
8 March ..	„ .....	.....	.....	12	11	Reacts as above (milk not tested). Agglutination positive immediately, 1 in 60, with 1 positive Widal blood.
22 „ ...	„ .....	.....	.....	12	9	Reacts as above.
29 „ ...	{ Fæces	1	1	12	.....	Not further tested.
	{ Urine .....	.....	.....	.....	.....	None present.
6 April ...	Fæces .....	.....	.....	.....	.....	Tested on 7/4/15. Agglutination positive, 1 in 60, with 1 positive Widal blood.
12 „ ...	„	1	1	.....	.....	Not further tested.
19 „ ...	„	1	1	.....	.....	„ „
26 „ ...	„	2	1	.....	.....	„ „
16 May ...	„	1	1	.....	.....	„ „ (B. proteus noted).
17 „ ...	„	(Plate overgrown. B. typhosus present.)		.....	.....	„ „
25 „ ...	„ .....	„	„	.....	.....	„ „
31 „ ...	„ .....	„	„	.....	.....	Re-acts as previously (milk not tested).
14 June ...	„	Present	.....	.....	.....	Not further tested.
21 „ ...	„ .....	„	.....	.....	.....	Arabinose negative, Sorb. A, not further tested.
29 „ ...	„	Predom.	.....	.....	.....	Not further tested (no lactic acid bacilli derived from the sour milk detected).
5 July ...	„	2	1	.....	.....	Not further tested.
12 „ ...	„	Present	Present	.....	.....	„ „
19 „ ...	„	„	„	6	4	„ „
3 August ...	„ .....	.....	.....	10	.....	No B. typhosus isolated (? overgrown).
23 „ ...	„	Mostly typhoid	.....	6	4	Not further tested.
6 Sept. ...	„	Typhoid very numerous, ap- parently no coli.	.....	.....	.....
20 „ ...	„	10	1	.....	.....	1 tested. G.M.D.L.S., typical.
11 Oct. ...	„	3	1	.....	.....	1 „ „
25 „ ...	„	3	2	.....	.....	Not further tested.
8 Nov. ...	„	1	1	.....	.....	„ „
29 „ ...	„	1	1	.....	.....	„ „
13 Dec. ...	„	Mostly	.....	.....	.....	2 tested. G.M.D.L.S., typical.
1916.						
3 Jan. ...	„	10	1	6	6	Not further tested.
31 „ ...	„	Numerous	.....	.....	.....	„ „
28 Feb. ...	„	4	1	.....	.....	„ „
3 April ...	„	Predominate.	.....	12	9	„ „
2 May ...	„	Nearly all B. typhosus.	.....	6	6	„ „
6 June ...	„	100	1	1	1	1 colony tested. G.M.D.L.S., typical reactions.
3 July ...	„	Practically all B. typhosus.	.....	.....	.....	Not further tested.
7 „ ...	Blood .....	.....	.....	.....	.....	Agglutination positive, 1 in 60, 1 hour (B. typhosus, L.I.P.M.)
14 Aug ...	Fæces	Practically all B. typhosus.	.....	.....	.....
5 Sept. ...	„	Majority	.....	.....	.....
1916.						
3 Oct. ...	„	4	1	.....	.....
9 „ ...	Blood .....	.....	.....	.....	.....	Agglutination with own organism positive 1 in 60, few minutes, but negative 1 in 100, with B. typhosus, L.I.P.M.
7 Nov. ...	Fæces	Mostly	.....	12	12	Two colonies tested, G.M.D.L.S., peptone, typical reactions.
13 „ ...	„	10	1	.....	.....	Not further tested.
27 „ ...	„	2	1	.....	.....	„ „
4 Dec. ...	„	2	1	12	4	„ „
11 „ ...	„	1	1	.....	.....	„ „ (plate overgrown).
18 „ ...	„	2	1	.....	.....	„ „
1917.						
2 Jan. ...	„	100	1	.....	.....	„ „
8 „ ...	„ .....	.....	.....	.....	.....	„ „ (B. typhosus present).
29 „ ...	„	Practically all.	.....	.....	.....	„ „
5 Feb. ...	„	10	1	.....	.....	„ „
12 „ ...	„	10	1	.....	.....	„ „
26 „ ...	„	Majority.	.....	.....	.....	„ „
5 Mar. ...	„	3	1	.....	.....	„ „
12 „ ...	„	Mostly.	.....	.....	.....	„ „
24 April ...	„	Practically all.	.....	.....	.....	„ „

* G = glucose; M = mannitol; D = dulcitol; L = lactose; S = saccharose; Sorb. = sorbitol; Arab. = arabinose; A = acid.

3. DIPHTHERIA.

(C. N. DOUGLAS.)

(a) ROUTINE EXAMINATIONS OF SWABBINGS.

During the year, 1,925 swabbings were examined in ordinary routine for the presence of diphtheria bacilli, the numbers thus examined during 1915 and 1914 being 1,774 and 1,777 respectively. In addition, 849 swabs were received from boys on the training-ship "Tingira," which are dealt with separately.

The 1,925 swabs were received from general practitioners in the neighbourhood of Sydney, and in the country, from the smaller hospitals, more especially country ones, and occasionally for diagnostic purposes from small institutions, soldiers in camp, &c.

The same procedure in their examination was carried out in 1916 as in previous years, the cultures being examined at the end of twenty-four hours, and, if negative then, again at the end of forty-eight hours. The staining method adopted was that of Neisser, chrysoidin modification.

As in previous years, the positive results have been again divided into positives after twenty-four hours' incubation, and positives after forty-eight hours' incubation. Though in most cases a culture of forty-eight hours' incubation has been examined twice, in some instances, as, for example, in swabs arriving at the week-end, the cultures have only been examined once, viz., at the end of forty-eight hours' incubation. Therefore, the positive results under the forty-eight hour division are again divided into those positive after one examination, and those only positive after a second examination. As 477 swabs were positive after only twenty-four hours' incubation, and 118 were negative after twenty-four hours' incubation, but positive after forty-eight hours' incubation, the value attached to the re-examination of negative swabbings after further incubation is again illustrated, as it has been in previous reports. A review of the total positive results for different months shows that the smallest number was received in October, 15. In September there were 23; in August, 25; in December, 35; and in July, 37. The highest numbers were received in March, 109; in April, 76; and in January, 71. These numbers correspond in incidence relatively closely with those for 1915.

During the year the disease was again, as in the previous year, rather endemic than epidemic, and, contrary to our experience previous to that period, there was an increased number of positive cases in the warmer months rather than in the colder months of the year.

Table IA shows the monthly percentage of positive swabbings to the total positives for the year, and illustrates the same incidence of the disease, if it be assumed that we received each month the same relative number of positive swabbings as there were cases of the disease amongst the community. In June, 1913, and in June, 1914, the highest monthly numbers of positive swabbings to the total yearly positives occurred; June, 1915, was third on the list, precedence being taken by March, and then January, whilst during 1916 June was eighth on the list.

Table IB shows the percentage of positive swabbings to the total number of swabbings submitted for each month. This table is probably of much less value than the preceding one, inasmuch as the results may be considerably upset by the submission of a large number of swabbings from some particular source when a single case of diphtheria or of suspected diphtheria arises, as, according to circumstances, the number of negative swabbings thus submitted may vary from a few to a hundred. Such additions to the figures at once discountenance their value.

Table II gives a list of cases examined on more than one occasion. Five of these cases were under observation for from two to three months, one being examined on fifteen occasions over a period of 163 days, being positive thirteen time and negative twice.

TABLE I.—PRACTITIONERS' CASES.

Month.	Positive 24 hours.	Positive in 48 hours.		Total Positive.	Negative.	Suspicious.	Total Throat.	Nasal.		Total Nasal.	Other regions. No growth, &c.	Grand Total.
		1st Exam.	2nd Exam.					Positive.	Negative.			
January ...	57	2	12	71	72	11	154	...	...	...	.....	154
February ...	45	1	7	53	101	14	168	1	4	5	1 (direct smear) ...	174
March	80	..	29	109	139	18	266	7	3	10	7 (no growth)	276
April	66	3	7	76	118	10	194	...	...	...	3 (no growth)	196
											From right and left ear, nega- tive; from va- gina, negative.	
May	44	1	16	61	127	12	209	...	4	4	2 (no growth)	205
											1 (sloughing sur- face, positive).	
June	49	1	3	53	100	3	156	1	8	9	3 (no growth)	165
July	29	1	7	37	71	6	114	...	12	12	.....	126
August ...	19	1	5	25	117	5	147	1	8	9	1 (no growth)	156
September.	14	...	9	23	110	8	141	2	17	19	.....	160
October ...	12	...	3	15	61	11	87	...	2	2	.....	89
November..	40	...	7	47	64	11	122	...	6	6	2 (vaginal swabs, negative).	123
											
December..	22	...	13	35	55	5	95	...	1	1	.....	96
	477	10	118	605	1,125	114	1,844	12	65	77	.....	1,925

TABLE IA.—MONTHLY percentages (of positive swabbings) of total positives for the year.

January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
10·08	8·75	11·01	12·56	10·	87·6	6·10	4·01	3·80	2·47	7·76	5·78

TABLE IB.—PERCENTAGES of positive swabbings each month of total number submitted in each month.

January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
46·10	30·46	30·5	38·77	20·75	32·12	25·33	16·02	14·37	16·85	36·71	36·44

TABLE II.—TABULATED Results of repeated swabbings from individual patients.

Period over which patient was examined.	Number of times positive.	Number of times negative.	Total number of examinations in each case.	Period over which patient was examined.	Number of times positive.	Number of times negative.	Total number of examinations in each case.
Up to 1 week—				From 2 to 3 weeks—			
2 days (2 cases).....	1	1	2	21 days (2 cases).....	2	1	3
2 „ (3 „ ).....	.....	2	2	21 „ (1 case).....	1	3	4
2 „ (1 case).....	1 (suspicious).....	1	2				
3 „ (2 cases).....	1	1	2	From 3 to 4 weeks—			
3 „ (2 „ ).....	.....	2	2	23 days (1 case).....	1	1	2
3 „ (1 case).....	1 (suspicious).....	1	2	23 „ (1 „ ).....	.....	2	2
4 „ (2 cases).....	1	1	2	27 „ (1 „).....	3	1	4
4 „ (2 „).....	1 (suspicious).....	1	2	27 „ (2 cases).....	1	1	2
4 „ (4 „ ).....	.....	2	2	23 „ (1 case).....	1	1	2
5 „ (3 „).....	1	1	2				
5 „ (3 „ ).....	.....	2	2	From 4 to 5 weeks—			
6 „ (1 case).....	.....	2	2	30 days (1 case).....	7	3	10
6 „ (1 „).....	3	.....	3	31 „ (1 „).....	3	.....	3
7 „ (6 cases).....	1	1	2	31 „ (1 „).....	4	.....	4
7 „ (1 case).....	1	2	3	33 „ (1 „).....	5	1	6
7 „ (4 cases).....	.....	2	2	33 „ (1 „).....	2	.....	2
				33 „ (1 „).....	1	1	2
From 1 to 2 weeks—				From 5 to 6 weeks—			
8 days (2 cases).....	2	.....	2	37 days (1 case).....	5	1	6
8 „ (1 case).....	.....	3	3	40 „ (1 „).....	2	1	3
9 „ (1 „).....	1	1	2	42 „ (1 „).....	1	3	4
9 „ (1 „).....	1 (suspicious).....	1	2				
12 „ (5 cases).....	1	1	2	From 6 to 7 weeks—			
13 „ (1 case).....	2	.....	2	46 days (1 case).....	5	2	7
13 „ (2 cases).....	1	1	2	49 „ (1 „).....	2	1	3
14 „ (1 case).....	1	1	2				
From 2 to 3 weeks—				From 2 to 3 months—			
15 days (1 case).....	3	.....	3	63 days (1 case).....	8	1	9
15 „ (1 „).....	1	1	2	89 „ (1 „).....	7	.....	7
15 „ (1 „).....	2	.....	2	93 „ (1 „).....	2	2	4
17 „ (1 „).....	1	1	2	98 „ (1 „).....	9	.....	9
18 „ (1 „).....	2	.....	2	163 „ (1 „).....	13	2	15
18 „ (1 „).....	1	2	3				

(b.) SWABBINGS FROM THE TRAINING-SHIP “TINGIRA.”

We have given details in previous reports of swabbings submitted from boys of this training-ship. These have been taken either with the view of preventing the introduction, by new boys acting as “carriers,” of diphtheria bacilli to the ship, or for the purpose of diagnosis in cases of suspicious sore throats. The routine has been adopted of taking, in each case, one swabbing from the throat and one from each nostril. During 1916, 41 throat swabs were found to be positive, 21 suspicious, and 462 negative. Of nasal swabbings, of which, as a rule, two were taken from each individual, 38 were positive, 73 suspicious and 622 negative. It is probable that most of the suspicious organisms were diphtheroid bacilli. In view, however, of the importance of preventing the introduction of diphtheria, any case in which organisms were found which, though by no means typical, nevertheless might possibly be unusual forms of diphtheria bacilli, were regarded as suspicious and precautions taken.

In one case nine examinations were made from one individual, extending over a period of three months. Six of these examinations, including the ninth, revealed the presence of diphtheria bacilli, whilst three were negative. Full tests were made of the organism isolated from the last specimen submitted, with the result that morphologically typical diphtheria bacilli were found which gave the typical “sugar” reactions, but proved non-toxic to a guinea-pig.

TABLE III.—SWABBINGS FROM THE TRAINING-SHIP “TINGIRA.”

Throat Swabbings.				Nasal Swabbings.			
Positive.		Suspicious.	Negative.	Positive.		Suspicious.	Negative.
24 hours.	48 hours.			24 hours.	48 hours.		
14	27	21	462	6	32	73	622

4. TUBERCULOSIS.

EXAMINATION OF SPUTA FOR TUBERCLE BACILLI.

(C. N. DOUGLAS.)

During the year, 1,394 specimens of sputa were received from general practitioners, &c., to be examined for tubercle bacilli. Of this number, six bottles were found to be in a leaking condition, thus constituting a dangerous menace of infection to the staff, and the contents were destroyed without examination. In addition 884 sputa were received for the same purpose from the Rookwood State Hospital and Asylum. The following tables of the two series have been kept separate.

Of 1,388 specimens of sputa from private practitioners 364 were positive, showing a percentage of positive sputa to the number of sputa examined of 26.15. In thirteen cases doubtful results were obtained, and in such cases further specimens were asked for. Probably as a result of the notification of pulmonary tuberculosis in the Metropolitan and Newcastle districts, the number of sputa from private practitioners has increased from 812 in 1914 to 1,017 in 1915, and 1,388 in 1916. The methods of examination are the same as those detailed in previous reports. The results have been arranged in tables showing the results for each month with the percentage of positives, and the results for each quarter. In the case of the Rookwood State Hospital results details are given of the cases examined more than once.

As in previous years the percentage of positive results during the late winter and early spring months of the year are lower than at any other period of the year. Comparing a six monthly period extending from May to October, inclusive, with a similar period from November to April, inclusive, the average percentage is 20.98 in the first instance and 25.5 in the second. This is probably due to the prevalence of catarrhal conditions in the winter and spring months, leading to the submission of sputum whenever such conditions persist for an unduly long period of time.

TABLE I.—Result of the Examination of 1,388 Specimens of Sputa from various sources.

	Positive.	Negative.	Doubtful.	Total No. of Examinations.
Cases examined once only	350	977	12	1,339
Cases examined twice giving same result on each examination (17 cases)	10	24	...	34
Cases examined three times, giving the same result on each examination (3 cases)	3	6	...	9
Cases examined four times, giving the same result on each examination (1 case).....	...	4	...	4
Cases examined twice, giving different results on each examination (1 case)	1 (b)	...	1 (a)	2
(a) 1st examination, (b) 2nd examination.				
Total (1,361 Cases)	364	1,011	13	1,388

TABLE II.

Months.	No. of cases examined.	No. of examinations.	Positive examinations.	Percent of positives to number of examinations.	Negative examinations.	Doubtful.	Remarks.
January ...	103	103	35	34	67	1	
February ..	93	93	27	29	66	...	
March	97	97	31	31.95	64	2	
April	86	88	32	36.35	55	1	Two cases were re-examined, tubercle bacilli being present in every specimen.
May	115	117	23	19.65	94	...	Two cases were re-examined. Tubercle bacilli were not detected in any of the specimens.
June.....	97	101	27	23.76	74	...	Three re-examinations were made— Two cases (examined twice) were negative on each occasion.
July.....	120	126	20	16	103	1	One case (examined three times) was positive on each occasion.
August.....	142	143	34	23.77	109	...	Three re-examinations were made— Case 1 (examined 3 times) was negative on all occasions.
September	142	144	30	21.52	108	5	Case 2 (examined 4 times) was negative on all occasions. Case 3 (examined twice) was negative on all occasions.
October ...	114	118	27	21.18	91	...	One case re-examined was negative on both occasions. Two re-examinations were made— Case 1 (examined twice) was negative on both occasions. Case 2 (examined twice) was first time doubtful, second time positive.
							Four re-examinations were made— Three cases (examined twice) were negative on each occasion. One case (examined twice) was positive on each occasion.

TABLE II—continued.

Months.	No. of cases examined.	No. of examinations.	Positive examinations.	Percent. of positives to number of examinations.	Negative examinations.	Doubtful.	Remarks.
November	136	140	42	29.28	97	1	Three re-examinations were made— Case 1 (examined twice) was positive on each occasion. Case 2 (examined 3 times) was negative on each occasion. Case 3 (examined twice) was negative on each occasion.
December	116	118	36	28.81	80	2	Two re-examinations were made— Case 1 (examined twice) was negative on each occasion. Case 2 (examined twice) was positive on each occasion. In addition, six bottles containing sputa were received during the year in a leaking condition, thus constituting a source of infection to the staff, and the contents were destroyed without examination; also two jars were found to be empty on arrival.
Totals ...	1,361	1,388	364	26.15	1,011	13	

TABLE III.—Showing the Positive Results for each quarter of the year of the Sputa detailed in Table I.

Quarters of the Year.	Number of Examinations.	Positives.	Percentage of Positives.
January, February, and March.....	293	93	31.74
April, May, and June.....	306	82	26.79
July, August, and September.....	413	84	20.33
October, November, and December	376	105	27.9
	1,388	264	26.15

TABLE IV.—Examination of Sputa from the Rookwood State Hospital and Asylum, Lidcombe.

	Positive.	Negative.	Doubtful.	Total Number of Examinations
Cases examined once only	98	117	...	215
Cases examined more than once, giving the same results on each examination—				
Examined twice (55 cases)	20	88	2	110
Examined three times (56 cases) .....	...	168	...	168
Examined four times (25 cases) .....	...	100	...	100
Examined five times (18 cases) .....	...	90	...	90
Examined six times (4 cases).....	...	24	...	24
Examined seven times (3 cases) .....	...	21	...	21
Examined eight times (2 cases) .....	...	16	...	16
Examined nine times (1 case) .....	...	9	...	9
Examined thirteen times (2 cases) .....	...	26	...	26
Examined fifteen times (1 case) .....	...	15	...	15
Cases examined more than once, giving different results on different occasions—				
Examined twice—				
— + = 4 cases.....	4	4	...	8
Examined three times—				
— — + = 3 cases.....	5	11	2	08
— — + ? = 1 case				
— + — = 1 case				
+ — + ? = 1 case				
Examined four times—				
— — — + = 1 case	4	11	1	16
— — + ? = 1 case				
— + — — = 1 case				
+ — — — = 1 case				
Examined five times—				
— — — + — = 1 case	3	16	1	20
— — — — + ? = 1 case				
— — — — + = 1 case				
+ — — — — = 1 case				
Examined seven times—				
— — — + + — = 1 case	8	20	...	28
— — — — + — = 1 case				
— + — — — — = 1 case				
+ — — — — — = 1 case				
Total (404 cases)	142	736	6	884

TABLE V.—Showing the Positive Results for each quarter of the year of the Sputa detailed in Table IV.

Quarters of the Year.	Number of Examinations.	Positive.	Percentage of Positives.
January, February, and March	268	53	19.73
April, May, and June.....	258	44	17.05
July, August, and September.....	208	31	14.9
October, November, and December.....	150	14	9.3
	884	142	16.06

5.—ROUTINE COMPLEMENT FIXATION REACTION FOR SYPHILIS.

(BURTON BRADLEY, M.B., D.P.H.)

In considering the 886 cases examined during 1916, we have not attempted to make a full analysis of the figures, and this for several reasons, but principally because the historical notes forwarded to us on the cases tested do not form a reliable source of information necessary for a scientific analysis of our results. In many cases we had no reply to our request for historical details, and in others the reply was so meagre as to be useless for the purpose.

No definite conclusions can therefore be drawn from these figures as to the value of the method adopted in the diagnosis of syphilis.

The technique used is practically that of the original Wassermann test, except that an alcoholic extract of guineapig heart (sometimes reinforced with cholesterol) is employed as "antigen."

In each test 0.1 c.c. of the serum to be tested is mixed in saline with 0.1 c.c. of fresh undiluted guineapig serum, and 0.5 c.c. of diluted organ extract. Controls containing 0.2 c.c. of each serum tested and 0.1 c.c. guineapig serum serve to exclude auto-deviation of complement by the patient's serum. Also there is a control containing 1.0 c.c. of dilute organ extract, and 0.1 c.c. guineapig serum to exclude excessive deviation of complement by the extract alone. Every time the test is made the hæmolytic serum is titrated against the unit dose 0.1 c.c. of guineapig serum, and from two to three minimal doses of hæmolytic serum used to sensitise the corpuscles, which are used in doses of 1 c.c. of 5 per cent. strength.

In the attached table are shown the results obtained on 886 serums tested during 1916. Some of these serums were tested on more than one occasion, but only the first result is used in the compilation of the table.

It is interesting to note that whereas amongst the whole series of tests approximately 25 per cent. show a full positive reaction, yet there are considerable variations in the percentage of positives found in the various classes of patients dealt with. It is doubtful, however, what these differences really indicate, as quite a number of circumstances may affect the type of cases submitted. Thus, unless every inmate of an institution be tested it is manifestly impossible to draw definite conclusions as to the relative prevalence of syphilis. The type of institution and the type of patient will vary the results greatly.

As regards cases tested on more than one occasion, ninety-four of the above were tested twice or more, and of these—

75 were tested twice,
10 ,, three times,
6 ,, four ,,
3 ,, five ,,

TABLE showing Results of Complement Fixation Test for Syphilis, 1916.

Submitted by.	Total.	Complete positive.	Strong positive.	Moderate positive.	Weak positive.	Negative ?	Negative.	Doubtful.
		per cent.						
Federal Quarantine Dept..	82	21 (26)	3	9	3	4	41	1
Prisons Department	62	20 (18)	1	3	2	2	24	0
Police Department	6	1 (16)	0	0	1	0	4	0
Rookwood Asylum	22	0 (0)	0	0	3	2	18	0
Newington Asylum	7	0 (0)	0	1	0	0	6	0
Liverpool Asylum	75	23 (31)	5	5	7	7	26	2
Military Authorities.....	139	26 (19)	4	10	14	15	69	1
Naval Authorities	64	12 (20)	3	2	12	3	32	0
Coast Hospital.....	256	71 (28)	9	13	18	12	128	5
Practitioners.....	172	37 (21.5)	8	7	17	12	88	3
Total	886	221	33	50	77	57	436	12
Approximate, per cent	...	25	4	6	9	6	49	1

6. DENGUE FEVER IN AUSTRALIA.

ITS HISTORY AND CLINICAL COURSE, ITS EXPERIMENTAL TRANSMISSION BY *Stegomyia fasciata*, AND THE RESULTS OF INOCULATION AND OTHER EXPERIMENTS.

(By J. BURTON CLELAND and BURTON BRADLEY, assisted in the Inoculation Experiments by W. McDONALD, M.B., Ch.M., Rookwood State Hospital and Asylum, Sydney).

Scheme of presentation of the results.

Summary of results.

Future investigations.

Introduction.

Origin of these experiments.

- I. The history of dengue fever in Australia with a short summary of the clinical descriptions of previous epidemics.
- II. Clinical description of the 1916 epidemic of dengue fever in the North Coast of New South Wales.
- III. Mosquitoes and dengue.
 - (a) Previous work bearing on the experimental production of dengue fever by mosquitoes.
 - (b) Australian mosquitoes as conveyors of disease.
- IV. Review of the results of the mosquito experiments.
 - (a) First series of mosquito experiments.
 - (b) Second series of mosquito experiments.
 - Summary of experiments.
 - Descriptions of results.
 - General conclusions from Series II.
- V. Review of the results of the inoculation and allied experiments.
 - (a) Clinical description of cases artificially inoculated in Sydney.
 - (b) Consideration of cases 1 to 9.
 - (c) Cases showing that the virus exists in the blood serum (and) or corpuscles.
 - (d) A case inoculated with whole citrated blood.
 - (e) Cases in which the serum of clotted blood was used for injections.
 - (f) Cases showing the experimental results with washed corpuscles.
 - (g) Cases in which the fluid part of citrated blood was injected.
 - (h) Cases in which a Pasteur-Chamberland filtrate of the serum and corpuscles obtained from clotted blood was injected.
 - (i) Cases in which a Pasteur-Chamberland filtrate of the citrated blood was injected.
 - (j) Cases showing the presence of the virus in the blood on certain days of the disease.
 - (k) Cases apparently showing the absence of the virus after recovery from the disease.
 - (l) Case showing the establishment of immunity shortly after recovery from an attack of dengue fever.
 - (m) Cases showing that the blood can retain its infectivity outside the body for varying periods.
 - (n) Cases showing the length of the incubation period of the inoculated disease.
 - (o) Is the length of the incubation period dependent on the strain of the virus, or on the susceptibility of the patient, or on both?
 - (p) Case sequences in relation to immunity.
 - (q) Can the disease be conveyed by an application of serum to a scarification?
 - (r) Speculations on a possible relationship between certain insect-borne diseases and the acute exanthemata.
 - (s) The relationship of dengue to yellow fever.

- Appendix
- I. Details of natural cases of dengue from whom inoculations were made.
 - „ II. Details of first series of mosquito experiments.
 - (a) Experiments with *Stegomyia fasciata*.
 - (b) Experiments with *Culex fatigans*.
 - „ III. Detailed histories of the four successful cases in which the Virus of Dengue was conveyed by *Stegomyia fasciata*, in the Second Series of mosquito experiments.
 - „ IV. Tabulated statement of the details of the inoculation and allied experiments.
 - „ V. Histories of cases in which materials from cases of dengue were injected, &c.

SCHEME OF PRESENTATION OF THE RESULTS.

Owing to the large amount of data which we have accumulated in carrying out our investigations into the nature of dengue fever as met with in Australia, and the necessity for presenting these data in full, so that they, and our conclusions, may be subjected to detailed criticism, it has been necessary to adopt a rather unusual scheme of presentation

presentation in submitting our results and conclusions. Thus we have relegated to appendices the full and detailed accounts of all the human cases which were the subjects of experiments. As on these experimental cases our most important conclusions are based, it is absolutely essential that each should be described in the fullest way possible, and we feel that their inclusion in the body of our report would so overload it with detailed matter that obscurity would result.

In the body of our report we review, under various headings, the results of these experiments, the deductions that may be made from them, and the temporary inferences that may be drawn from them. In this revision references are made to the cases on which the review is based, and the individual case or cases may then be consulted in full in the appendices to see whether the deductions or inferences are fully justified or not.

Preceding this review of the results of our experiments, and leading up to these results, will be found a history of the disease in Australia, a clinical description of the recent epidemic, and a section dealing with the relationship of mosquitoes to dengue, more especially with reference to Australia.

At the very beginning of our report we give a summary of the more important results obtained, deductions made, or inferences drawn, which summary, somewhat in the shape of a proposition in Euclid, will indicate what we set out to prove or substantiate.

The table of contents will indicate to the casual reader, or to those interested only in some particular portion of our work, the scope and nature of our investigations, and in what particular portion of the report any particular item will be found.

SUMMARY OF RESULTS.

1. Dengue fever in Australia is undoubtedly an introduced disease. It has been existent from time to time in epidemic form since 1885.

2. The clinical description of the disease agrees with that of the dengue described in text-books, the only departure noted being the distinct tendency to a relatively, and sometimes absolutely, slow pulse rate as compared with the temperature.

3. It is possible that under the single term "dengue" more than one disease is at present included.

4. Epidemic dengue in Australia is approximately co-extensive with the known distribution of *Stegomyia fasciata*. It does not extend beyond the area in which this mosquito is prevalent.

5. *Stegomyia fasciata* mosquitoes caught in a dengue-infected district in the surroundings of cases of the disease, and some of them known to have fed on a dengue patient on the first and second days of his illness, transported to a non-dengue district, reproduced the disease in four out of seven persons on whom biting experiments were conducted.

6. Blood taken from three of these four cases reproduced the disease when injected into further persons. The blood of one case was not tested.

7. The incubation period of the four cases was found to be possibly between five and nine and a half days, probably between six and a half and nine and a half days, counting from the bitings to the definite onsets.

8. No known case of contagion occurred from any of the above four cases.

9. No evidence was obtained from two cases, one of which was heavily and repeatedly bitten with *Culex fatigans*, that *Culex fatigans* is capable of acting as a transmitter of dengue fever.

10. The blood of patients suffering from an attack of dengue can reproduce the disease when inoculated subcutaneously into healthy persons.

11. The disease thus inoculated is typical in every way of dengue fever naturally contracted. The inoculated disease may or may not show marked skin rashes and double phases in the temperature charts, and presents a relatively and sometimes absolutely slow pulse: such variations occur in the natural disease. The incubation period of the inoculated disease varies from five to nine days, corresponding with the incubation period of the mosquito-transmitted disease.

12. Results of the inoculations show that—

- (a) The virus of dengue is present in the blood as a whole.
- (b) The serum of clotted, infective blood may contain the virus.
- (c) With washed corpuscles one apparently positive result was obtained out of three experiments.
- (d) The fluid part of citrated infective blood may contain the virus.
- (e) With Pasteur-Chamberland filtrates of infected serum and corpuscles, one positive result was obtained out of five experiments.

In considering these results, failure to convey the disease must not necessarily be interpreted as meaning that the menstruum employed never does contain the virus, as in some of the cases the blood may no longer have been infective at the time at which it was withdrawn.

- (f) The presence of the virus in the blood has been demonstrated on the second and third days of the disease. Two experiments made may possibly be interpreted as showing that infective material may still be present on the eighth day of the disease.
- (g) One experiment appears to indicate that the virus is no longer present in the blood on the fourteenth day from the beginning of the illness.
- (h) Immunity to the inoculation of infective blood appears to be complete twenty-four days after recovery from a typical attack of dengue.

- (i) Infected blood may maintain its infectivity outside the body if kept in a cool place for seven days at least.
- (j) In two instances two individuals inoculated with the same material on the same day exhibited incubation periods practically identical in duration.
- (k) The infection of dengue can be conveyed by sub-inoculations from individual to individual at least to the fourth generation without the resultant disease departing from the type of the natural disease.
- (l) The disease has not been conveyed by the application of infective serum to a scarified area; nor apparently has it been conveyed by the application of infective material by swabbing to the nostrils.
- (m) A very doubtful and probably negative result followed the gargling of the throat with infective material, followed by swallowing of the same.
- (n) Dengue fever has close analogies with yellow fever.

FUTURE INVESTIGATIONS.

The following points require elucidation by further research, and we trust that later we may have an opportunity of carrying some of them out:—

1. To ascertain the period that must elapse after *Stegomyia fasciata* has bitten a dengue patient before the insect can transmit the disease to another human being.
2. To ascertain the length of time that such an infected mosquito may remain infective.
3. To ascertain whether the virus can be transmitted through the eggs to the progeny of such infected mosquitoes.
4. To ascertain whether *Culex fatigans*, *Scutomyia notoscripta*, or any other mosquito, can also act as intermediate hosts of the organism of dengue.
5. To ascertain for how long after the third day of the disease the virus may still exist in the blood of the patient.
6. To ascertain how long immunity after an attack may last.
7. A repetition of the experiments suggesting that the virus may be able to pass through a Pasteur-Chamberland filter.
8. A repetition of the experiments with washed corpuscles to ascertain whether the organism exists as an intra-corpuscular parasite or merely becomes attached to the corpuscles.
9. A repetition of the experiments with serum to ascertain whether the positive results obtained from this source were due to accidental inclusion of infected corpuscles, or liberation of parasites into the serum from injured corpuscles, or whether these results were due to the virus being a natural inhabitant of the serum.
10. A repetition of the experiments with ingested blood and with the application of infected material to the nares and to local scarified areas to ascertain whether the virus so ingested or applied can induce the disease.

INTRODUCTION.

Epidemic dengue first reached Australia early in 1885. In the same year, according to Castellani and Chalmers in their "Manual of Tropical Medicine," it reached the Fiji Islands, "to which it was conveyed by a European suffering from the complaint." As later on in the same year a record occurs of cases of dengue fever on a steamer which arrived in Sydney from Fiji and Noumea, it is possible that the disease reached Australia from Fiji. Since this date, from time to time very extensive epidemics of dengue have occurred in Queensland, sometimes extending to the northern coastal towns of New South Wales.

A careful comparison of previous *clinical* descriptions of the epidemic disease known as dengue in Australia, with the description of the disease compiled from various sources as given in Castellani and Chalmers' "Manual of Tropical Medicine," does not reveal anything tangible to suggest that more than one disease has, up to the present, been comprised under the term "dengue fever." The only important clinical difference appears to be that in the Australian disease, though the pulse varies more or less with the temperature, it is nevertheless relatively slow, and sometimes absolutely so. Further, the dengue fever met with in Australia is undoubtedly not indigenous, and as a disease of this nature, which is confined to human beings, cannot arise *de novo*, the dengue fever of Australia must have had its origin outside Australia, and must be a disease which has affected from time immemorial the inhabitants of some other part of the world. Such a striking disease cannot have escaped observation and accurate record. It is quite obvious that it is included under the term "dengue," as this is used, for instance, by Castellani and Chalmers.

Elsewhere in this report, chiefly as a result of our investigations, will be discussed the question as to whether or not under the broad term "dengue" it is possible that more than one distinct entity has hitherto been included.

ORIGIN OF THESE EXPERIMENTS.

In March, 1916, an extensive epidemic of dengue, then prevalent in Queensland, reached some of the north coast towns of New South Wales. The incidence on the population was exceedingly heavy, and business was greatly disorganised in consequence. As the experiments into its means of spread in Australia hitherto carried out had been few and inconclusive, it was considered advisable to visit the area affected and collect material there for further study of the disease. It was recognised that if infective

material could be conveyed to Sydney, a town in which indigenous cases of the disease have never been known to arise, results might be obtained which would be free from fallacies attendant on experiments conducted in the epidemic area. At the beginning of April one of us, therefore, with an assistant, paid a visit to Murwillumbah. He found that though the chief incidence of the disease had passed, there were still numerous cases, and that two species of mosquitoes were very abundant in the town, namely, *Culex fatigans* and *Stegomyia fasciata*. He collected a number of both species of these mosquitoes, more especially from houses in which cases of dengue had occurred and preferably in the actual rooms of patients then ill with the disease. In addition he withdrew specimens of blood, some of them being allowed to clot and some being received in citrated normal saline solution, from patients suffering from the disease. The materials thus obtained were brought back to Sydney.

At this early stage of the investigations, the following main objects were held in view:—

1. To try and transmit the disease to human volunteers by means of one or other of the two species of mosquitoes which had been captured in the epidemic area.
2. To attempt to establish by inoculation of material from the blood a strain of the disease for further study as to the incubation period, symptoms and signs, immunity, &c.

With the mosquitoes in the first instance conveyed to Sydney, amongst which there had been a heavy mortality, successful transmission of the disease was not achieved. However, by the inoculation of material obtained from the cases in the epidemic area—and from the blood of a patient who had contracted the disease in the epidemic area, and had reached Sydney before he recovered, and from the blood of one of us who had made the journey and who had contracted the disease in the epidemic area, and had developed it after his return to Sydney—strains of the disease were successfully established in Sydney. Though unfortunately in the early cases some of the volunteers received inoculations of blood from two different sources, thereby obscuring certain data in connection with their cases, the main point attempted at this stage was achieved, namely, the establishment in human beings of strains of the disease by inoculation. The bulk of the experiments detailed later consisted of sub-inoculations from these primary inoculation cases. It has been considered advisable to tabulate in full in the shape of an appendix, each individual in chronological sequence on whom experiments were made. Under various headings, the results of these experiments are discussed as a whole with the object of ascertaining what information of value in connection with the disease, and indirectly with other similar diseases, can be reasonably deduced from the results obtained.

The failure to transmit the disease by the first batch of mosquitoes brought down from the epidemic area led to another of us with an assistant visiting in May the adjacent town of Mullumbimby, then suffering heavily from the epidemic. A further considerable number of *Culex fatigans* and *Stegomyia fasciata* were brought back to Sydney, and the typical disease was conveyed by the bites of the batch of *Stegomyia fasciata* to four volunteers in Sydney, thus establishing conclusively the rôle that this mosquito can play in the spread of the disease.

I. THE HISTORY OF DENGUE FEVER IN AUSTRALIA, WITH A SHORT SUMMARY OF THE CLINICAL DESCRIPTIONS OF PREVIOUS EPIDEMICS.*

II. CLINICAL DESCRIPTION OF THE 1916 EPIDEMIC OF DENGUE FEVER ON THE NORTH COAST OF NEW SOUTH WALES.

The facts utilised in compiling this description were mostly obtained by observations and notes on cases seen by us on visits to the infected district, and by some observations on imported, mostly military, cases in Sydney. Thus our description is one largely of the symptomatology of the illness compiled from histories given us by patients, who, at the time, were suffering or had recently suffered from the disease. In particular we have little exact information as to the type of temperature or the pulse charts in the naturally occurring cases, and our descriptions of these are for the most part based on observations on our experimental mosquito-borne cases, or on what we have been told was the case by observers in the infected district. We have availed ourselves also of the excellent description by Goldsmid and Crosse,† to which we refer the reader.

Definition.—Dengue fever is an infective, non-contagious disease caused by an unknown organism which may be transmitted by the bite of *Stegomyia fasciata*. It is characterised by one or more febrile paroxysms more or less severe, head and body pains, and usually by polymorphous skin eruptions.

Incubation Period.—This is approximately one week (five to nine days). During this time the patient may feel perfectly well or may experience towards the end of the period some vague pains, malaise, headache or sleeplessness.

Onset.—This, in the large majority of cases, is described as sudden. Frequently the patient will give the exact hour at which he was taken ill, and may narrate how before a certain time he was quite well, and that after an extremely short period, perhaps half an hour from the first symptom, he was prostrate with the disease. Out of thirty cases replying to questions as to the nature of the onset, twenty-five replied that it was sudden, three that it was gradual. In two cases the replies were doubtful. The

* This has been fully dealt with by one of us (J.B.C.) in the Third Report of the Government Bureau of Microbiology dealing with the work performed during the year 1912, and published during 1914 by the Government Printer, Sydney. Those interested are referred to that report.

† Goldsmid & Crosse, "Some Notes on Dengue." *Med. Jnl. of Australia*. May 6, 1916, p. 377.

The onset is usually accompanied by fever, headache, malaise and slight shivering, and to a greater or less extent by pains and aches, which are very characteristic in the typical cases. In certain cases the relationship between the fever and other symptoms is less definite and the fever may precede or post-date the other symptoms.

Course.—After the onset the disease runs a course lasting from a few days to a fortnight or more (four to seven days—Goldsmid and Crosse). There may be two periods of intensity of fever and symptoms, separated by a period, varying in length but usually only of a day or so, of comparative abeyance of fever and symptoms, during which the patient may regard himself as well. This double phase is, however, in our experience, by no means a constant phenomenon, and its absence cannot be regarded as militating against the diagnosis of dengue. Moreover, especially in mild cases, although a 4-hour temperature chart may show a distinct double-phase variation, the symptoms and temperature do not always vary *pari passu*. In some cases there appears to be a tendency to relapse at a later period, but we have no very precise information on that point. In a typical case, after a sudden onset accompanied by a rapid rise of temperature, shivering and headache, and occasionally slight vomiting, the patient takes to bed with pains in the back and limbs and severe headache. He passes a very restless night and may be delirious. He finds it almost impossible to rest in any position. For the following day or so the headache and body pains are worse. The temperature soon falls, and this may be accompanied by sweating, and the patient gets up, not feeling very well, and with a dirty tongue and a residue of pains. One, two, or three days later the temperature goes up again and the symptoms return. The second attack lasts for one or two days, and then convalescence ensues. In the stage of onset there is usually an erythematous blushing of the skin, and later on, from the second to the seventh day, a more distinct rash frequently appears.

It will be best now to review *seriatim* the outstanding symptoms and signs of the disease as met with in the North Coast.

The Temperature and Pulse.—We do not wish to discuss these fully at the present time, as our investigations have not enabled us to take first-hand records of many natural cases. From the information we can gather, however, the double phase temperature is not constant, but inasmuch as few of the cases are in hospital where accurate records can be obtained, we cannot dogmatise on this point.

Goldsmid and Crosse say: "The temperature rose sharply and reached 101–103 deg. F. During the course of the illness it remained high and did not undergo marked fluctuation. Not infrequently it reached 105 deg. F. just before the termination of the fever. The fall was as rapid as the rise."

The pulse rate in natural cases has not come under our personal observation to any extent, but Goldsmid and Crosse confirm the results we obtained in our injection experiments. They say: "It (the pulse) was invariably slow in proportion to the temperature. A pulse rate of 75 to 90 was frequently associated with a temperature of 102 deg. or 103 deg. A more rapid pulse rate than 90 was rarely noted save just before the final fall of temperature."

The pulse rate and its relation to the temperature in experimental cases is discussed fully in a separate section.

The Facies.—The face soon assumes a very characteristic appearance, and in our experience this is one of the most useful signs of the disease. It looks red, swollen, hot and puffy. The eyes are usually somewhat injected, but there is neither excessive lachrymation nor any running at the nose. *Coryzal signs are notably absent*, although it must not be forgotten that an ordinary "cold in the head" may coincide with an attack of dengue. Out of twenty-six cases questioned as to the occurrence of "running at the nose" only one described it as being present.

The facies of dengue has been described as resembling that of a person recovering from an alcoholic bout. It is also somewhat suggestive of the face in the early stage of measles but without the coryzal condition. The typical facies is most marked shortly after the onset, or, when this occurs, in the recrudescence period.

Headache.—Headache is a practically constant phenomenon. Thus, out of twenty-six cases questioned all gave a history of headache. In some cases it was located as frontal; in others as vertical or occipital; and quite frequently as "all over the head." Frontal headache is hard to distinguish from the characteristic eye pains, and the sufferer frequently refers to pains "at the back of the eyes." The intensity of the headache varies very much. In certain cases it appeared to be the principal cause of complaint, sometimes being described as "agonising," whilst in others it was referred to as slight.

Eye Pains.—The painful eyes are, in our opinion, quite one of the most characteristic single signs of dengue, and are almost always present in some degree. Sometimes the eyes are said to be aching severely and painful on movement, and we have seen cases where the whole head was turned rather than move the extremely sensitive eyes. In others, it is only by careful questioning that the presence of some pain or tenderness in the eye-balls or eye-muscles is elicited.

Out of twenty-eight cases questioned, twenty-five described pains in the eyes and three denied their existence. Out of thirteen cases questioned on the point, eleven said the eyes were painful to move, and two replied negatively.

Apparently the earlier symptom is pain in the eyes or in the "back of the eyes," easily confused with frontal headache. Later there is definite pain and tenderness apparently in the eye-balls which is associated with pain on ocular movement and probably often with some photophobia.

Occasionally

Occasionally the eyes are described as "sore," which word may be used to refer to the irritation of slight conjunctival congestion, but conjunctival symptoms are never prominent and the adjective "sore" is probably frequently used to refer to the deeper-seated pains in the eye-balls.

General or Body Pains.—These vary very much in degree and are by some described as intense and agonizing, and they may require the administration of morphine: in other cases they are described as "tired feelings," "gone in the knees," and "influenzal pains." In our experience the "break-bone" type of case is the exception, and the pains are, as a rule, not a very prominent feature. Sometimes their occurrence is denied in a particular case, or only elicited after careful questioning. Restlessness and inability to stop in one position is characteristic of some cases, and is probably closely linked to the body-pain symptoms. Out of thirty-two persons questioned, all described various degrees of *body pains* somewhere in the *spinal axis*, and out of twenty-six questioned, all described pains in the limbs. The back of the neck is a common seat of fairly severe pain (sixteen out of eighteen questioned). *Lumbo-sacral pain* is also common—"across the back"—fourteen out of fourteen questioned. Real *pains in the joints* appear to be uncommon apart from the general limb ache. Movement does not seem to definitely increase the pains, but when severe, the patient generally takes to bed because of the pain and associated symptoms. The body pains of dengue are in our opinion not associated with any readily demonstrable lesion. No swelling, redness or tenderness, were noted in any case. This is in striking distinction to the description by Osler, who refers to red, swollen and painful joints.

Abdominal Pains.—These were described by ten out of a series of sixteen cases questioned, and are sometimes associated with diarrhœa. At other times they are apparently a "spreading reund" from the lumbar and dorsal region of the back pain. Pain in the epigastric region, associated with vomiting, is spoken of by Goldsmid and Crosse as occurring in several cases.

The body pains gradually subside, but there is usually a recrudescence of the pains when the second phase occurs. After the febrile stage is over there is generally some tiredness or aching for several weeks in the spine or limbs, which, however, gradually passes off.

Other nervous symptoms occurring in the disease are giddiness, delirium, mental irritability, depression and sleeplessness.

Giddiness is a common feature at various times in the course of the disease (nineteen out of twenty-two questioned).

Delirium is not frequent, but we have seen cases where there was maniacal delirium for three nights after the onset, and many cases show some mental wandering when the temperature is high. Delirium was mentioned as a symptom in six out of twenty-one cases questioned on the point.

Mental Irritability is a striking feature of the disease, especially in the later stages.

Depression.—The depression following the attack is one of the most marked features, and the patient may be actually incapable of concentration or serious mental effort for a week or so after the attack.

Sleeplessness is found at some time in nearly all cases.

Gastro-intestinal Symptoms are not marked. There is, however, a *dirty tongue*, which is rather characteristic, being furred at the back with a strawberry tip very like that seen in scarlet fever. The *fauces* are reddened—Goldsmid and Crosse note a fine stippling of the soft palate as an early characteristic sign—and there may be some sore throat. This is usually not marked. *Anorexia* is a feature in most cases (thirty out of thirty questioned). *Nausea* is fairly common (eighteen out of twenty-nine questioned), and *vomiting*, though not as a rule marked, is met with especially at the onset (thirteen out of twenty-nine questioned) and occasionally may be severe. Some cases suffer no disturbance of the bowels, but *diarrhœa* is present in a few cases (two out of twenty-nine). *Constipation* is not general (four out of eleven).

Shivering occurs commonly (twenty out of twenty-four cases questioned). It may occur with the onset and during the febrile stage, but rigors are the exception.

The Skin Eruptions.—According to Goldsmid and Crosse the preliminary and terminal rashes were well marked in cases seen by them. They note, however, that the preliminary rash could easily be overlooked. They describe this as a "fine punctiform rash usually found over points of friction. . . . It appeared and disappeared very suddenly. . . . A fine stippling of the soft palate was often the only rash present when the patients were first seen." They describe the terminal rash as "polymorphous," and as being present in nearly every case. "It was either papular or a dark red, blotchy rash, or an urticaria."

Our own experience probably covers a somewhat different type of case to that seen by Goldsmid and Crosse, as a great number of dengue sufferers seen by us had not consulted any medical man at all, and these were generally the mild cases which may show an absence of certain symptoms or signs. Thus, while we agree in the main with them, we would modify their description in certain particulars. We do not think a rash is often entirely absent, but it is often so transitory or slightly marked that unless the patient is under medical examination, and even then at times, it is easily overlooked. This applies not only to the preliminary but to the later rash. Our experimental cases bear this out. It will be seen that in several cases we were unable to make up our minds at all as to whether a rash was or was not present.

The

The distinction also between the prodromal and later rash is, in our opinion, not very valuable. Although in some cases it is possible to note definite skin eruptions at two periods separated by a period in which the rash is absent or not marked, there are such great variations in the degree and type of the skin conditions of dengue that the distinction into two rashes is not of great value.

Early in the disease it is unusual to find a definite eruption though we have seen cases with well-marked measles rashes within 48 hours of the onset. A hypersensitiveness of the skin which tends to the production of blotchy erythema on points of pressure is an early sign, and *tâche cérébrale* is well marked in most cases. The red congested condition of the face has been referred to before. In the early stages it is quite frequent for two observers to differ as to the presence of a rash. The more definite skin eruption is generally found later. Though it may be found well marked from the second day, it may not be noticed till the fifth or seventh day. It presents somewhat variable characteristics and lasts from a day or so to (rarely) several weeks, and is usually followed by slight desquamation and sometimes by intense itching.

We have not sufficient data to describe accurately the distribution of the rash, but we have found it affecting almost any part of the trunk and limbs. It seems as a rule to be less marked on the face, which merely shows congestion. On the back, especially in the lumbar region, it is frequently very distinct, and extends round on to the abdomen, where it is often less marked. The legs and arms are frequently affected, as a rule the arms showing more definite lesions. The hands are liable to be affected, and bright pink spots, followed by intense itching and desquamation, are sometimes found on the palms.

The characteristic of the rash has been described by someone as its "want of characteristic." We think a good definition for the rash in many cases is "mid-way between those of measles and scarlet fever, but less definite." It is, as a rule, some form of a blotchy erythema, though especially in later stages the eruption does not completely fade on pressure. The size and shape and intensity of the blotchings, to a great extent, account for the differences in appearance. In most of the cases seen by us patches of red skin alternate with pale (normal) patches in a most irregular mottling. The red patches show no definite point of maximum intensity, but at times the hair follicles are red and prominent, giving a strawberry appearance to the red blotches. The red areas do not show definite lines of demarcation from the adjacent normal skin. The blotchings vary in size, but are usually not more than $\frac{1}{4}$ to $\frac{1}{2}$ an inch square. On the legs of one patient, however, there were large irregular patches much larger than this and of a very bright pink. At the same time this case had a dull measly mottling on the trunk.

In some cases we have seen a very characteristic reddening and swelling of the elbows of a peculiar tint suggestive of a stain of eosin that has been partly washed out. This may be surrounded by a papular condition in the vicinity. Papular rashes have been rarely noted by us, but sometimes are seen on the feet or lower legs.

We have seen no urticarial cases, but these are described by Goldsmid and Cross and others, and some cases have told us they had this condition. They present another variation of the skin lesion.

Two other skin conditions should be noted here. In the North Coast district we have seen several cases of a papulo-pustular condition around the ankles and extending up the leg for perhaps 12 inches. This was described to us by several patients as a sequel of dengue, but we are not sure whether this was not due to infected mosquito bites or to infection conveyed by scratching the irritable desquamating skin. *Jaundice* is said to occur in some cases and we have seen it in a few ourselves, but it has never been more than slight. It is of interest, however, in connection with the suggested relationship of dengue with yellow fever.

Diagnosis.—From "influenza" the diagnosis rests chiefly upon the absence of coryzal symptoms, usually present with the so-called "influenza" seen in this country. As we have previously mentioned, the absence of coryza is a noticeable feature in dengue. Twenty-six persons were specifically questioned on this point, and all but one denied having any "cold in the head," "running at the nose," etc. Cough, again, which may be a feature of certain influenzal attacks, is usually absent. It was described in only seven out of twenty-four cases questioned. When present it is seldom more than a slight irritative cough, probably associated with the naso-pharyngeal congestion which is often present. The rash, and double-phase temperature, and eye-pains on movement, are important points when present.

From *scarlet fever* and *measles* dengue may be difficult to differentiate in isolated cases, and typical cases with a rash occurring early in an epidemic are often diagnosed as measles or scarlet fever. The coryza, nature and distribution of the rash, and Koplik's spots should generally, however, make a diagnosis of measles possible. The pulse in measles is rapid; in dengue often relatively slow. In scarlet fever the early vomiting, throat angina, type of rash, quick pulse, and leucocytosis are important points.

The diagnosis from *yellow fever* is not of much importance in this country at present, but should be kept in mind in view of the possibility of the introduction of yellow fever into the *Stegomyia*-infested part of Australia. *Jaundice*, though sometimes seen in dengue, is not frequent. *Albuminuria* is absent in dengue. The slow pulse of yellow fever, which is used as a differential sign by Guiteras, cannot be employed with the dengue of Australia. The mild nature of the disease is a practical point when dengue is epidemic, though we cannot exclude the possibility of mild cases of yellow fever appearing. In fact some observers have suggested that the dengue of Australia

is really a modified yellow fever. The history of the disease and the known variability of dengue in various parts of the world, even in different parts of Australia, and the fixed mild character of the disease here, are arguments against this. It seems probable, however, that dengue fever is a closely related disease to yellow fever.

Acute rheumatic fever should be considered, but the localisation of pains in the joints and the absence of rash are usually sufficient. Inasmuch as other observers have described painful, hot swellings of the joints, in some epidemics of dengue, it is possible that further investigation may disclose such cases in Australia. With one doubtful exception, we have never seen any joint affections. This case was a child in the early febrile stage of some infection, who had pains and some swelling in several joints, but we were not able to follow the case further and do not know the final outcome. One of us diagnosed the case as "acute rheumatism."

III. MOSQUITOES AND DENGUE.

(a) *Previous work bearing on the Experimental Production of Dengue Fever by Mosquitoes.*

Graham (1903) reported experiments which are generally regarded as showing that *Culex fatigans* is able to convey the infection of dengue fever. In his experiments, four men slept under mosquito bars containing mosquitoes which had bitten dengue patients. Three cases of dengue resulted, four, five and six days after the first biting. The other case was unsuccessful. These experiments were conducted in a dengue district, and, to obviate the possibility of other means of infection in the infected district, Graham took mosquitoes to a mountain village where no cases of the disease had occurred, and similarly infected there two persons, with incubation periods of four and five days respectively.

He admits that in many, perhaps in all, of his experiments, *Stegomyia fasciata* were present amongst his mosquitoes. He seems to us, therefore, at most, to have proved that mosquitoes can carry the disease, the variety or varieties remaining in doubt.

Graham gives also, but without convincing detail, the history of a case injected with the salivary gland of a *Culex*, which had fed on a dengue patient twenty-seven days previously. He says the patient "had a chill on third day and high fever, and an attack resembling in every way that of dengue, but so strong that I desisted from further experiments in that line." "That this was not septicæmia was proved by the finding of numerous dengue parasites in the blood." The second sentence suggests a doubt as to the diagnosis, and the finding of the "dengue parasites," which Graham discovered in his dengue cases, but which were probably artefacts, cannot be regarded as proof as to the nature of the disease.

It is interesting to note Graham's remarks as to the distribution of *Culex fatigans* and *Stegomyia fasciata*. These appear to have been both plentifully present in Beyrouth, but on the higher parts *Culex fatigans* was the principal mosquito, whilst in some villages there were few or no mosquitoes at all. As far as we can gather from his paper, the distribution of the dengue fever may have corresponded closer with the *Stegomyia* distribution than with the *Culex* distribution, but he has not analysed this point.

Bancroft's (1905) results were no doubt vitiated to some extent by the fact that he was working in an infected district. This may operate in two ways. Firstly, his apparently successful cases might have acquired the disease in some other fashion, and, secondly, his failures might be due to the cases experimented with having passed through mild attacks of the disease previously. He had two apparently successful cases, the subjects of which were bitten by *Stegomyia fasciata* twelve and ten days after these had bitten dengue patients, whilst in the failures the persons bitten were bitten fifteen and seventeen days after the mosquitoes had fed on individuals suffering from dengue. His experiments cannot be regarded as in any way conclusive, but are highly suggestive, and one is inclined to wonder that they have apparently not been repeated since. He notes that persons living in the country (non-infected districts?), visiting town friends with dengue in the day-time, acquired the disease, and deduces from this that if dengue is a mosquito-borne disease, *Stegomyia fasciata*, which is diurnal in biting habits, may be an efficient agent in the transmission.

Ashburn and Craig (1907) report one successful case in nine persons bitten by *Culex fatigans*. They regard three of these cases as not fair experiments, as proved later by unsuccessful intravenous injections of dengue blood, and another because he had possibly previously had the disease: the other three subsequently developed mild attacks of dengue on inoculation. One person was not bitten by the mosquitoes. The mosquitoes used had been reared in captivity, and then fed on dengue cases. In the successful case, the subject was exposed under nets on 12th September, 1906, to the bites of *Culex fatigans*, which had bitten a patient with dengue on 11th September, 1906, but he was not bitten until the night of 13th September, and developed no symptoms until the night of 17th September. His temperature, however, rose on the 16th, nearly 24 hours before. The incubation period would be from three-and-a-half to somewhat over four days. The symptoms appeared to be fairly typical, and there was a slight rash on the abdomen and chest.

It is to be noted that the chart of this case shows the temperature to have been above the normal from the 13th September. This tendency to be above normal may be noticed in several of the charts of injected cases shown by these authors as occurring well before the onset of the fever.

The successful case was probably one of dengue, but arguing on analogy with yellow fever, the very short mosquito "ripening" period (less than 2 days) would make one accept it with reserve as originating from the mosquitoes. One cannot certainly exclude the possibility of there being other sources of infection. Failing other evidence, the case is undoubtedly very suggestive of the possibility of *Culex* being a vector of dengue, but we can hardly understand the importance attributed to this isolated case by most text-books.

In reviewing the above series of experiments carried out by observers in three different parts of the world, it will be seen that as regards Graham's observations, whilst the evidence very strongly suggests that *Culex fatigans* is the transmitting agent, this cannot be considered as being definitely proved on account of the probability that *Stegomyia fasciata* were included amongst the mosquitoes used.

The results of Ashburn and Craig are much more doubtful from the point of view of incriminating *Culex fatigans*. Their mosquitoes apparently conveyed the infection so soon after having bitten a true case of dengue that no reasonable time could elapse to enable the organism of dengue to go through a phase of its life cycle in the mosquito. If their successful case arose from the bites of *Culex fatigans*, and was not a case of natural infection, the most reasonable view to take is that, in this instance, the mosquitoes merely acted as infected lancets and not as true intermediate hosts.

Bancroft's experiments, on the other hand, very strongly support the view that *Stegomyia fasciata* transmits the disease, and are only vitiated by the fact that the experiments were conducted within the endemic and epidemic area.

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(b) Australian Mosquitoes as Conveyers of Disease.

As both *Culex fatigans* and *Stegomyia fasciata* are common household pests in most parts of Australia, which have suffered from this recent epidemic of dengue, it seemed quite probable that, if a mosquito were a vector of this disease, it might be one or other or both of these two species. *Culex fatigans* is common in summer time in the southern districts of Australia where dengue does not occur, whilst the distribution of the disease is practically that of *Stegomyia fasciata*. Coupling these facts with the observations and experiments of Dr. Bancroft, greater suspicion naturally falls upon *Stegomyia fasciata* than upon *Culex fatigans*. In our experiments both of these species were used. *Stegomyia fasciata* was found to bite freely in captivity in the day time, but *Culex fatigans*, though it did bite at night time, was more shy and difficult to handle. In considering the transmission of the disease, a study of the habits of the mosquitoes in an infected area is important. Observations of the mosquitoes in general will show why it is that some species can readily transmit disease, whilst in the case of others disease transmission is unlikely. *Culex fatigans* and *Stegomyia fasciata* are essentially domestic mosquitoes, thereby possessing increased facilities for transmitting diseases to human beings over "wild" mosquitoes. It is highly probable that both are introductions to Australia, having been non-existent here before the arrival of the white population. Both can apparently be easily conveyed from place to place by means of human agencies.

In this place it may be well to review shortly a few of the Australian mosquitoes which may play a part in conveying disease, or are present in exceptional numbers.

Culex fatigans Wied.—This is the common domestic mosquito, and is probably almost universally distributed throughout Australia. One of us (J.B.C.) has met with it abundantly in Sydney and in many country towns in New South Wales, and also in Adelaide. In the warmer parts of Australia it may probably be found biting throughout the year, but in the southern parts it disappears throughout the cold months, though during warmer evenings an occasional individual may be met with. It is essentially a night-biter and a feeder in the dark. We have never met with it biting during the day-time, but it occasionally bites in the evening in a poorly lighted room. Under these circumstances, it is more especially the legs or some other portion which is not exposed to the light that are bitten. The hum of the mosquito at night-time is very disturbing, the anticipation being more annoying than the bite itself, which in the cases of a number of individuals can hardly be noticed. Many of those bitten by the mosquito do not react by the raising of a wheel. At any time in bed the approach of the mosquito can usually be felt by the currents of air produced by the wings. This draws attention to the parts where the mosquito settles, and, as it begins to feed, in many cases a slight but indefinite pricking sensation indicates the exact site. However quickly the hand is raised without disturbing the bedclothes, it is only rarely the movement is sufficiently quick to enable the mosquito to be destroyed. Its breeding place is in various domestic water supplies—probably the cisterns of water-closets may prove to be one of the most important of these. In places such as Sydney where, during summer in some seasons, there may be long periods without any rainfall, and in other seasons abundant rains for many days, the number of mosquitoes may be greatly increased under the latter conditions, indicating that breeding places form as a result of collections of rainwater. It has not yet been ascertained exactly where these outside breeding places are located in a city like Sydney, where, in the better residential

residential localities, tins, broken bottles, and similar receptacles are not left lying about; but it is probable that places, such as depressions in gutter spoutings, are some of the most important sites.

The distribution of this mosquito extends far beyond the area in which dengue fever has occurred. For instance, though the mosquito is abundant in the neighbourhood of Sydney, no indigenous cases of dengue are known to have arisen in this city. Considering that imported cases of dengue have been not uncommon, the inference might be drawn that if *Culex fatigans* were capable of transmitting this disease, endemic cases should in consequence have arisen in Sydney.

Stegomyia fasciata Fabr.—*Stegomyia fasciata* occurs in Queensland and extends into the northern coast towns of New South Wales. We have found it at Tweed Heads, Murwillumbah, Mullumbimby, Byron Bay, Casino, and Grafton. Dr. Ferguson has also identified specimens from Maclean and Tabulam.

Though the species has been recorded from Newcastle and from Victoria, there seems considerable doubt as to the identification, and in all probability specimens so designated were really *Scutomyia notoscripta*.

The insect is a day-biter, and during the recent dengue epidemic it was abundant in houses in the affected district, usually being more active in rooms that were dimly lighted. It was found breeding in water tanks, and in similar domestic supplies, one such source worthy of notice being open water in connection with acetylene gas installations. It is interesting to note that larvæ were drawn off from the bottom of a tank which was 4 to 5 feet high, and which, as heavy rain had been falling for some days, was presumably full of water. In two or three jugs of water drawn off from the bottom, some larvæ were obtained which afterwards hatched out. It is possible that these larvæ had sunk to the bottom for the purpose of moulting, as it is hard to believe that the insect in its active phase could descend to a depth of 4 to 5 feet in the water and rise again sufficiently quickly to maintain its activities with their necessary accompaniment of oxygen.

We were able to confirm the statement recently made that the eggs of *Stegomyia fasciata* can resist drying for some while and then develop under suitable conditions. In our second batch of these mosquitoes a number of eggs were laid in a small dish of water. On 29th June, this dish had become perfectly dry and was left exposed on a laboratory bench until 30th August, that is, during the end of winter and the beginning of spring. It was then immersed in water, and in a few days some of the eggs hatched. Owing to the weather being cold these developed very slowly, but early in November a recently hatched adult was found floating on the surface of the water. At this period it was also noticed that a number of further eggs had hatched, the weather having become warmer. It would therefore appear that not only can the eggs resist two months absolute drying and then develop immediately on immersion in water, but that they may also remain for some period without developing in this water until the weather becomes warmer.

A review of the above distribution of *Stegomyia fasciata* will show that the recent epidemic of dengue was nearly co-extensive with it. Thus, the epidemic appeared in all of the towns mentioned with the exception of Maclean and Tabulam, about which we have no information. It is interesting further to note that the epidemic extended southwards along the railway line, and this is doubtless explained by travellers becoming infected in one town and developing the disease in another, and there infecting the local mosquitoes and starting a fresh centre of the infection. Probably railway communication also facilitates the dispersal of *Stegomyia fasciata*. Though we did not find *Stegomyia fasciata* in railway carriages at Murwillumbah during the epidemic, we found them in the station-master's office at Byron Bay. At Murwillumbah the mosquitoes found in the railway carriages were chiefly *Culex fatigans* and occasionally *Culicella annulirostris*.

Scutomyia notoscripta Skuse.—This is a widely-distributed mosquito throughout Australia, though we have never met with it in much abundance. It resembles very closely *Stegomyia fasciata* in its thoracic markings, but can be at once distinguished by a pure white band on the proboscis. It may occasionally be found biting inside houses. It is not known to be responsible for conveying any disease to human beings.

Culicella vigilax Skuse.—This is the common bush mosquito so numerous at certain periods of the year in the neighbourhood of Sydney and other similarly-situated districts. In places it is exceedingly numerous, as, for instance, in some of the creeks running into the Hawkesbury River, where human beings may be attacked by hundreds of these insects at a time. The bite is fairly painful, and often raises small wheals. It is very interesting to compare the behaviour of this mosquito when attacking man with that of such domestic mosquitoes as *Culex fatigans* or *Stegomyia fasciata*. As already indicated, these two latter are exceedingly wary in their habits, so that it is a matter of skill to kill them when they are attempting to bite. With *Culicella vigilax*, however, the insects settle on the hand or face, and the finger can be slowly lowered down upon them, and can crush them without disturbing them. *Culicella vigilax* is an Australian species accustomed to live in our bush, and probably to feed chiefly upon birds and marsupials. Living on these hosts, which are unable to protect themselves against attacks of the mosquitoes by slapping them with hands, there has been no need for the mosquito to be very dexterous in leaving the host on which it has settled. Restless movements on the part of the animal attacked would be the usual means of dislodging the pest. Consequently, natural selection would allow a type to develop which was comparatively slow in removing itself from danger. Since the domestic mosquitoes *Culex fatigans*

fatigans and *Stegomyia fasciata* feed probably to a great extent on human beings, and to a less extent on birds, such as sparrows and swallows living in the neighbourhood of houses, and on domestic mammals, the perpetuation of the species has necessitated the development of exceedingly alert habits so as to escape from their most potent means of destruction—the hands of man.

Culicelsa annulirostris Skuse.—Though a widely-distributed mosquito in Australia, and present in the area affected by the recent epidemic of dengue, there seems no reason at present to consider that it is responsible for the conveyance of any disease in man.

Nyssorhynchus annulipes Walker.—This mosquito, the chief malarial transmitter in Australia, appears to be widely distributed throughout the continent, but in the southern parts, as a rule, only in small numbers. Here and there areas exist where it is present in sufficient numbers to be a source of danger should imported malarial cases reside there. In the coastal parts of Queensland, however, and in the Northern Territory, its incidence is sufficiently great to maintain in places endemic foci of malaria.

As regards the diseases spread, or possibly spread, by mosquitoes in Australia, malaria has already been mentioned. Our experiments on the conveyance of dengue have clearly proved that *Stegomyia fasciata* is responsible—is perhaps alone responsible—for the spread of this disease in Australia. The same mosquito, as is well known, is the transmitting agent of yellow fever. *Culex fatigans*, the common domestic mosquito, is a transmitting agent of *Filaria bancrofti*, and is apparently responsible for the distribution of this disease in Queensland. So far there are no other diseases of human beings in Australia which are known to be transmitted by mosquitoes.

IV.—REVIEW OF THE RESULTS OF THE MOSQUITO EXPERIMENTS.

A.—*First Series of Mosquito Experiments.*—Details of our first series of mosquito experiments will be found in Appendix II. Four cases were bitten by *Stegomyia fasciata* and two by *Culex fatigans*. Negative results were obtained. There was, however, a very large mortality in the mosquitoes collected, and the bitings, except in one case, which received ten bites, were unsatisfactory.

B.—*Second Series of Mosquito Experiments.*—In our second series of experiments mosquitoes were collected in Mullumbimby and the surrounding district, about one hundred *Stegomyia fasciata* and one hundred and twelve *Culex fatigans* being thus obtained. The insects were collected from the hotel at which we stayed at Mullumbimby, from the post office, and from private houses in the town and district in which dengue fever cases had occurred—in some cases from the actual bedroom where patients were lying sick with the disease. A few mosquitoes were caught on the journey from Brisbane to Mullumbimby.

Occasional *Culicelsa annulirostris* were found in Mullumbimby and on our journey, but are not included in the above, and, with the exception noted in our *C. fatigans* results, were not used in our experiments.

The *Stegomyia fasciata* and *Culex fatigans* mosquitoes were transferred to special cages, one containing *Stegomyia fasciata*, the other *Culex fatigans*. The cages were made with a rounded opening, to which was attached a net sleeve. Through this the hand could be passed to add freshly-caught mosquitoes and for the biting experiments.

At Mullumbimby, on 8th May, 1916, a dengue patient (X.), who became ill on 7th May, 1916, was bitten by the *Stegomyia* mosquitoes then in the cage. On 9th May, 1916, he was again bitten by *Stegomyia*, and on the evening of 8th May, 1916, he was bitten by the *Culex* mosquitoes. Both types of mosquitoes bit this patient well, and thus many of the Mullumbimby district mosquitoes had certainly been fed on the blood of a dengue case in the acute stage. Exactly how many mosquitoes bit this patient it is impossible to say, as this part of the work was conducted in a badly-lit bedroom.

On 11th May, 1916, these mosquitoes arrived in Sydney.

Biting experiments by the *Stegomyia* were conducted on 11th May, 12th May, 13th May, and 14th May, 1916, and by the *Culex* on 11th May, 12th May, 13th May, and 14th May, 1916, as shown more clearly later.

On 15th May, 1916, some seven *Culex* and eleven *Stegomyia* collected in the Grafton district, chiefly from houses of dengue patients, were added. Over one hundred and twelve mosquitoes were collected in Grafton, of the following species: *Stegomyia fasciata*, 27; *Culex fatigans*, 46; *Culicelsa annulirostris*, 37; *Nyssorhynchus annulipes*, 2. But although all care was taken, the mortality between Grafton and Sydney was large, and hence only this small number was added to the boxes.

Further feeding experiments were made with the remaining mixed Mullumbimby and Grafton mosquitoes, viz., with *Stegomyia fasciata* on 15th May, 16th May, 17th May, 18th May, 19th May, and 23rd May, 1916; and with *Culex fatigans* on 15th May and 16th May, 1916.

On 29th June, 1916, the cages used in the experiments were emptied of the dead mosquitoes, and the remaining bodies that were not crushed up were examined separately with a hand lens. Seventy-five *Stegomyia* were counted (two being males) in the *Stegomyia* cage; no other mosquitoes were found in this cage. Seventy-eight *Culex fatigans* (two being males), and one *Culex annulirostris* were found in the *Culex* cage.

This procedure forms an additional check by another observer (J.B.C.) that the classification of mosquitoes was made accurately by B.B., and although about twenty-five *Stegomyia* were unaccounted for—probably they had been unrecognisably crushed in travelling, &c.—we can be reasonably certain that no *Culex* mosquitoes were included in the *Stegomyia* cage with which we obtained our positive results.

Summary of Experiments.

The following is a short summary of the experiments made and results obtained with the mosquitoes, taking the nine persons volunteering *seriatim* :—

Case I.—J.G., male, laboratory assistant (18 years), the subject of an unsuccessful *Stegomyia* biting experiment of the first series, was bitten on 11th May, 1916, at 2.15 p.m. by some twenty-eight *Stegomyia* mosquitoes. He remained well until the afternoon of 19th May, 1916, eight days later, when he noticed he had headache. That evening at 7 p.m. (eight days and five hours), he was again bitten by *Stegomyia*, and, while sitting with his hand in the cage, first became definitely ill. He passed through a typical attack of dengue fever, showing a double temperature curve, rash, and symptoms described in detail below. Blood from this case reproduced the disease on injection. *Result positive.*

Case II.—McD., male, laboratory assistant, not previously the subject of experiment, was bitten on 12th May, 1916, by ten *Stegomyia*, and on 18th May, 1916, by three or four *Stegomyia*. He remained well until 3rd June, 1916, seventeen days from the second biting and twenty-two days from the first biting, when he had an influenzal attack with coryza for a few days, with no rash and nothing suggestive of dengue. *Result negative.*

Case III.—G., male, laboratory assistant, not previously the subject of experiment, bitten by about nine *Stegomyia* on 13th May, 1916, and by about three *Stegomyia* on 17th May, 1916. No symptoms have followed these bitings to date—14th July, 1916. *Result negative.*

Case IV.—Wm., male, laboratory assistant, not previously the subject of experiment, was bitten by about thirty-six *Stegomyia* on 14th May, 1916 (mid-day), and by about thirty-six *Stegomyia* on 15th May, 1916 (12.30 p.m. and 4.30 p.m.). On 20th May, 1916 (6 days and 9 hours from first biting), whilst going to bed at night, he became ill and had a typical attack of dengue, with double temperature, rash and other symptoms detailed in Appendix III. His blood on injection reproduced the disease. *Result positive.*

Case V.—M., female, a nurse, was bitten by eighteen *Stegomyia* on 16th May 1916 (noon), and became ill on 25th May, 1916, 10 p.m. (9 days and 10 hours later), and passed through a rather severe type of dengue with marked rash and double temperature. No blood was taken from this case for injection experiments. *Result positive.*

Case VI.—B.B., medical practitioner, was in dengue fever districts—Mullumbimby, Casino, and Grafton—leaving Grafton for Sydney by boat on 13th May, 1916. To keep the mixed Grafton mosquitoes alive, he allowed them to bite him on 12th May, 1916, and 14th May, 1916, but remained perfectly well till, on 23rd May, 1916 (2 p.m.). 10 days after leaving the dengue district, he was bitten by fifteen *Stegomyia*. He remained quite well till 29th May, 1916, and the temperature normal till 31st May, 1916, on rising, 9 a.m., 7 days and 19 hours, when he became definitely ill and passed through a severe attack of dengue, with definite prodromal and secondary rashes, double temperature, and marked pains, &c., as described in Appendix III. Blood from this case reproduced the disease on injection. *Result positive*, but open to criticism as having been in a dengue district 18 days before the attack developed.

Case VII.—W.T., bitten by one *Stegomyia* on 12th May, 1916. No illness followed. *Result negative.*

Case VIII.—M., a patient at a hospital, was bitten on 11th May, 1916, by about twelve *Culex fatigans*, and on 12th May, 1916, and 13th May, 1916, by an unknown number of *Culex fatigans*, and on 14th May, 1916, by at least twenty *Culex fatigans*. *Result negative.*

Case IX.—J.O.S., laboratory assistant, a subject of *Culex* experiment in the first series, was bitten on 15th May, 1916, by two *Culex fatigans* and on 18th May, 1916, by—*Culex fatigans*. No symptoms followed. *Result negative.*

Discussion of Results.

In discussing the above results, it is important for the reader to bear in mind that our main object was to determine whether either or both of the mosquitoes, experimented with were capable of transmitting infection. We were quite in the dark even if one or both types of mosquito were a transmitter of the disease, of a number of other important circumstances connected with such a possible means of transmission. The mosquito, if it carried infection at all, might or might not need a period to elapse after biting a patient before it became able to infect another person, and might remain infective for a period quite undetermined by us. Hence mosquitoes collected might not prove successful transmitters, not because they could not carry infection, but because they were not for one reason or another "ripe." Therefore, although our mosquitoes were collected in a district where dengue was prevalent, some from houses where patients were actually ill, and many from houses where patients had recently been ill, we felt it advisable to increase the chance of getting results by letting them bite patient X., who had acquired the disease in the usual manner, on the dates mentioned. We were not in a position, and did not try, to solve the question of the "ripening" period, if any, nor of the period during which the mosquitoes remained infective.

Again, we deemed it advisable to have our first volunteers bitten more than once, and that because of the uncertainty as to whether the mosquitoes had ripened, especially if infected from the known bitten patient, and because of the unknown time which the mosquitoes might remain infective. We foresaw that, to a certain extent, these multiple bitings might complicate our results and prevent us from obtaining the exact incubation period

period, but we attempted to arrange the experiments in such a way that we might hope to elucidate this point. As it turned out, the double biting has actually only interfered with the understanding of the incubation period in one case (Wm.), and the later volunteers, being only bitten once, tend to confirm, in this case, the longer incubation period rather than the 5 days 5 hours period which may have been the incubation period for Wm.

That we have succeeded in proving the principal hypothesis, the possibility of transmission by mosquitoes, depends mainly on the satisfactory nature of the evidence that our apparently successful cases were really instances of dengue fever. If we are successful in this there seems no escape from the conclusion that transmission had occurred through the agency of the *Stegomyia fasciata* used by us.

We have not, in our opinion, shown conclusively that *Culex fatigans* may not also spread the disease, though we think this unlikely.

That the disease which followed the biting of our volunteers by *Stegomyia* mosquitoes was dengue there can be no reasonable doubt when the following circumstances are considered:—In the four successful cases the illness began at a period of from six (possibly five) to nine days after being bitten, an incubation period whose limits were the same as those of cases of dengue fever conveyed by blood inoculation from previous cases. The symptoms, signs and clinical characteristics of the disease in the four successful mosquito cases were indistinguishable from those in attacks of dengue naturally contracted. Marked rashes in two of the cases were typical of those seen in certain dengue cases, and could not be confounded with those of measles or scarlet fever, the other febrile complaints with which a marked rash is usually associated. After the rashes disappeared, these two patients suffered from intense itching of the parts affected by the rash, in one case to such an extent as to be almost unbearable. Such intense pruritus, rendering life temporarily a burden, has occurred in some instances in the North Coast district of this State following the disappearance of the rash of dengue. This itching, following a febrile complaint accompanied by a rash, we consider to be almost pathognomonic, when it occurs, of dengue.

Of other noteworthy features characteristic in general of attacks of dengue fever, the following may be noted:—All the four patients showed a swollen, hot-looking condition of the face, with a flushed, red suffusion, resembling somewhat that seen in the incipient stages of measles, or after an alcoholic bout. They all had, in fact, what may be called the "dengue face." All the cases showed a sudden onset, more or less characteristic of dengue, and not so common in other febriculae. In all there was a marked tendency to a double rise of temperature, the early rise being followed by a fall for a few days and then by a final rise. The blood examinations made during the course of the disease showed a definite leucopenia, a characteristic feature of dengue.

In the three cases in which blood was taken during the height of the disease and injected into volunteers who had never been in contact with the patients, the disease was in this way successfully transmitted after the usual incubation period.

From the above resumé it is clear that the disease in the four volunteers was not measles, German measles, or scarlet fever, or any of the other acute infective fevers accompanied occasionally by similar rashes, such as the early stage of small-pox.

In all large communities there are continually present febrile complaints not accompanied by definite rashes, which are loosely styled "influenza." These vary much from time to time, and probably represent a number of distinct entities, with features so little characteristic, and symptoms so mild and evanescent, that it has not been possible as yet to differentiate one from another. Many of these are accompanied by a definite coryza, which was absent in our experimental cases. During the course of our experiments, such complaints were not absent from Sydney, and though in specific instances individual cases might resemble aberrant cases of natural dengue, none could be considered as typical cases, such as were our volunteers, and rashes did not develop.

Having established that the disease occurring in our four volunteers was dengue fever, it is necessary to show beyond reasonable doubt that the disease developed as a result of the bites of certain infected mosquitoes, *Stegomyia fasciata*. As two of the four individuals had never been in a dengue area, while a third had been away from such an area for eight years, and as the experimental bitings took place in a district in which dengue is unknown, except as imported cases, and as we know of no other means by which they could have become infected, no other conclusion is left save that the *Stegomyia* mosquitoes transmitted the disease. It is true that one of us, who contracted the disease naturally, had been in more or less daily association with two of these three volunteers, and had seen the third for a few minutes, but it is hardly reasonable to suppose that he should have carried infection to these three persons, and to these three only, and yet have failed to convey infection to other members of the staff and to his own household. The fourth volunteer, one of us (B.B.), had returned recently from a dengue area. It might, therefore, be suggested that the disease from which he suffered was naturally contracted there. It will be noted, however, that he had been away from the dengue area for a period of time far exceeding the established limits of the incubation period, so that, were his case one of natural infection, then the incubation period, in his case, of a typical attack must be considered to be twice as long as our results in other cases would indicate.

As further showing that the disease developed by the four volunteers is to be attributed to the bitings of the mosquitoes, is the fact that, though each volunteer was bitten on different days and with varying intervals between them, the incubation periods

of their complaints fell within the time found to be the incubation period in our blood inoculation experiments. Such results in four instances must be considered more than mere coincidences.

That we were not successful in conveying the disease to all the volunteers is not to be wondered at. These other persons were certainly not so extensively bitten as were the successful cases. As perhaps only a certain number of mosquitoes were infective, and as mosquitoes engorged with blood one day, whether infective or not, may not feed again perhaps for several days, it can be understood how such failures can occur, whilst the opinion that there may be a possible minimum amount of infective material necessary to ensure successful inoculation by bites of the mosquitoes is another hypothetical explanation.

Apart from this, the positive results obtained in the four successful cases overshadow entirely the three negative results, which need only be considered from the theoretical point of view as to why the patients did not develop the disease, and not from the practical point of view, as to whether or not *Stegomyia* is the vector.

Incubation period.—We are able, fortunately, to draw reasonably accurate conclusions, even from the first doubly bitten cases, as to the incubation period.

Case I.—J.G. became ill while actually being bitten for the second time. His is obviously an eight days' incubation period. *Case IV.*—Wm., the second successful case, was bitten on two successive days, and his incubation period would be six days and nine hours, or five days five hours, depending on whether we count from his first or second biting. In the case of *Nurse M.* the incubation period is definitely nine days ten hours, and in the case of *B.B.* about seven and three-quarter days, if we count from the first rise of temperature, and about five and three-quarter days if we count from the first feeling of malaise.

This gives us for our mosquito cases an incubation period of approximately six to nine and a half days, possibly, of five and a quarter to nine and a half days.

General Conclusions from Series II.

1. *Stegomyia fasciata* mosquitoes caught in a dengue infected district in the surroundings of cases of the disease, and some of them known to have fed on a dengue patient on the first and second days of his illness, transported to a non-dengue district, reproduced the disease in four out of seven persons on whom biting experiments were conducted.

2. Blood taken from three of these four cases reproduced the disease when injected into further persons. The blood of one case was not tested.

3. The incubation period of the four cases was found to be possibly between five and nine and a half days, probably between six and a half and nine and a half days, counting from the biting to the definite onset.

4. No known case of contagion occurred from any of the above four cases.

5. No evidence was obtained from two cases, one of which was heavily and repeatedly bitten with *Culex fatigans*, that *Culex fatigans* is capable of acting as a transmitter of dengue fever.

V.—REVIEW OF THE RESULTS OF THE INOCULATION AND ALLIED EXPERIMENTS.

(a) *Clinical Description of Cases Artificially Inoculated in Sydney.*

These observations on the clinical phenomena of dengue fever are based on the results of thirty-two experimental inoculations, &c., for the transmission of the disease made at the Rookwood State Hospital and Asylum. Thirty patients who volunteered for the experiments were treated in various ways.

Of the twenty-eight inoculations thirteen experiments gave positive results, the patients developing what we regard as undoubted dengue fever: twelve experiments gave definitely negative results, and seven gave doubtful results. We discuss the doubtful and negative cases elsewhere. In many of these the nature of the experiment led one to expect a negative result. The clinical description of the thirteen successful cases may be discussed in detail.

The incubation period is reckoned as the time elapsing between the date of inoculation and the appearance of the initial symptoms or signs. Omitting four positive cases which had more than one injection, and in which the incubation period is not quite definitely established, the other nine positive cases gave the following results: five to six days, three cases; six to seven days, two cases; seven to eight days, one case; eight to nine days, three cases. Hence the incubation period ranged from five to nine days. Five gave periods between five and seven days.

The onset was usually sudden, the symptoms, at first mild, becoming well-defined within a few hours. The most consistent initial symptom was *headache*, usually occipital, less often frontal, rarely general. In only one case was headache absent. A few had dizziness, and most complained of a "shivery feeling" in the early stages.

The temperature rose fairly rapidly from the beginning. On one occasion the temperature, and not the headache, was the earliest sign of infection; whilst in four cases the temperature and headache were practically coincident in time of appearance. Usually the temperature rose so rapidly that the maximum was attained on the first or second day. The temperature-curve showed some degree of fluctuation with a rapid subsidence, the fall being practically by crisis. Two of the cases showed the typical diphasic temperature charts.

charts. Four showed irregular diphasic charts, four showed irregular charts, and two showed definitely monophasic charts. One case relapsed and showed a monophasic variation in the first attack and a diphasic variation in the relapse. The highest temperature recorded was 104 deg. The average lay between 102 deg. and 103 deg.

The pulse rates in the inoculated cases form a very interesting study, but we wish to make clear from the start that our records are open to criticism from several points. Most of our cases were men close to or over 50 years of age, and all were inmates of an asylum, and may thus be regarded as of a selected type, and these may normally have pulse rates different from the normal active man of the outside world. Again, we have only the pulse record *after* the onset of the illness, and have not been able to control such pulse rates with the rates before the injection or other exhibition of presumably infectious material. We therefore present our own results with due reserve. We are inclined to think from some of the records of doubtful or negative cases that some degree of absolute bradycardia may be a feature of the pulse in such type of persons. We have submitted thirteen cases which we regard as having suffered from experimental dengue to detailed analysis, and have analysed the pulse-temperature ratio—(1) in the first stage of the fever; (2) in the second stage of the fever (in cases where the diphasic temperature variation was not clear we have made observations in early and later stages of the febrile phase); and (3) in the post-febrile condition. In Case 25 which we regard as an instance of relapse, the periods analysed were in the first monophasic febrile phase, in the inter-febrile interval, in the first and second stage of the relapse, and in the post-febrile phase. Summarising these results as well as possible in these thirteen cases, we may say that—

1. Eleven out of the thirteen showed during the febrile stage or stages marked *relative bradycardia*. One case showed periods of *definite absolute bradycardia*.
2. In what may be roughly regarded as the first febrile paroxysm, five cases showed marked *relative bradycardia*, and seven showed *slight relative bradycardia*. (In one case there was no record.)
3. In the second febrile stage, or in the latter part of an irregular febrile attack, nine cases showed marked *relative bradycardia*, two showed *slight relative bradycardia*, and in two definitely monophasic charts there is, of course, no record.
4. In the post-febrile phase there was marked *absolute bradycardia* in one case (pulse going as low as 42); *definite absolute bradycardia* (pulses at times below 50–55) in six cases; *slight absolute bradycardia* (below 50–60) in four cases; normal pulse in one case and no record in one case.

With the reservations above-mentioned, it appears from our results that—

1. There is a tendency to slow pulse in our infected cases of dengue, which may manifest itself by absolute or relative bradycardia.
2. Relative bradycardia is a remarkable feature of the latter part of the febrile paroxysm, or of the second phase when it occurs. It may occur from the onset of the fever, but is usually in the early stages less marked.
3. Absolute bradycardia is found in many cases in the post-febrile stage. It is generally intermittent in type and alternates with normal or quick pulse rates. It may be also found during the febrile stage.

THE PULSE IN EXPERIMENTAL (INJECTED) DENGUE.

Review of the Pulse Variation in the Inoculated Cases.

Case.	Age.	Type of Fever,	Pulse in Febrile Phases.		Post Pulse in Febrile Phase.				
			1st Phase (or early).	2nd Phase (or later).					
4	46	Irregular	Irregular, marked relative and definite absolute.		Definite absolute irregular.				
6	48	Diphasic.....	Sl.R.	M.R.	Normal.				
7	49	Diphasic*	Sl.R.	M.R.	Definite.				
9	56	Diphasic.....	(No record)	M.R.	No record.				
11	...	Monophasic	M.R. ....	.....	Slight.			
12	47	Diphasic*	M.R.	M.R.	Marked A.				
13	44	Irregular	Sl.R.	M.R.	Definite.				
16	55	Diphasic*	Sl.R.	Sl.R.	Slight.				
17	38	Irregular	Irregular slight relative		Definite.				
25	52	Relapsing— 1. Monophasic	Sl.R. } Sl.R.	M.R.	Slight.				
		2. Diphasic	Sl.R. } .....	.....	Definite.			
26	67	Monophasic	M.R. ....	.....	Definite.			
27	50	Irregular	M.R.	M.R.	Definite.				
29	46	Diphasic*	Sl.R.	M.R.	Slight.				
			Relative Bradycardia.		Absolute Bradycardia.				
Summary	{	Typical Diphasic	2	Slight	7	Marked	9	Normal	1
		Irregular Diphasic.....	4	Marked	5	Slight	2	Slight	4
		Relapsing	1	No record	1	No record	2	Definite	6
		Monophasic	2			(Monophasic.)	2	Marked	1
		Irregular	4			Absolute Bradycardia.		No record	1
					Irregular	1			

Sl.R. = Slight relative bradycardia. M.R. = Marked relative bradycardia. M.A. = Marked absolute bradycardia.
* = Irregular.

The appearance of the patient was at once suggestive. The face was flushed with a suggestion of puffiness about the features, and the conjunctivæ were injected. The injection of the eyes and of the pharynx was constant. The facies is comparable to that of a man in the early excitement of alcoholic indulgence, and is not unlike the facies of measles. The patients looked bright and alert, and made little or no complaint even in the cases showing marked reactions and notwithstanding that no analgesic or antipyretic drugs were used. Although the type of patients volunteering for this work would perhaps be less likely to complain than those of a finer mould, this comparative indifference to the disease is worthy of record, seeing that in the Murwillumbah epidemic the observers describe the facial expression as one of suffering and state that it was necessary in a few cases to resort to morphine. We should, however, correlate the mildness of the symptoms in our experimental cases with the fact that as soon as the case was found to be febrile he was put to bed and kept there till the attack was over whereas in many of the severe natural cases seen by us the patients had for a while attempted to carry on their work.

Pain in these cases was not a marked feature. The pains complained of were attributed in most cases to "aching muscles" and the common sites were the lumbar region, nape of the neck and limbs. Two subjects complained of "rheumatic pains," but the joints were neither swollen nor tender to touch. Two patients suffered no pain at all. In one or two cases the pains dominated the picture, but even then they were not severe, making the patient unhappy merely for a day or two.

The appetite was usually good and unimpaired. Only one patient complained of anorexia.

Five patients suffered from *nocturnal sweating*. The sweating was generally profuse. These sweats usually recurred for a few nights. One of us (W. McD.) records that they bore no relation to the temperature, coming on quite independently of its rise or fall, but examination of some of the charts suggests a relation between sweating and abrupt temperature falls.

Most of the patients slept well, but in four cases *sleeplessness* was complained of on occasional nights.

The rash.—Some degree of rash was an almost constant feature, being absent in only one of the positive cases and doubtful in two cases.

The prodromal rash was sometimes difficult to detect. In seven cases some more or less definite rash or eruption was noted. *The later eruption* was found in ten cases and absent in three cases. We have recorded the first appearance on days from the second to the seventh day of the disease, usually on the third or fourth day. The rash lasted a variable time being often visible ten days or more after its appearance. In many cases it is difficult to distinguish between the preliminary and later rashes, and the distinction does not seem a very useful one. Out of the thirteen cases considered, the later rash was marked in four cases, definite in four cases, slight in two cases, and negative in three cases.

Character of later rash.—In some cases the rash was polymorphous. In two cases it was morbilliform. Most commonly it was a pinkish erythematous mottling with irregularly shaped areas (sometimes definitely raised) of varying intensity of colour, surrounding islets of white. In one or two cases the rash covered the whole body, being apparent even on the soles of the feet; but in the main the distribution favoured the upper portion of the body, viz., the back, chest, abdomen and upper arms. Itchiness was sometimes complained of. A constant sign was a congested erythema of the back. This was present in cases showing no rash. In a few cases the rash persisted and was still visible when the patients were discharged.

Enlarged lymph-glands were palpable in two patients.

Vomiting in the early stages of the disease was observed in two patients. Four patients complained of a cough without expectoration.

The urinalyses revealed fairly constant results. The specific gravity varied from 1010 to 1025, the reaction was acid and there was no albumen. In two cases the specific gravity rose suddenly during two days to 1030 and a reduction of Fehling's solution took place. Following on this, the specific gravity of the two urines fell to 1006 and 1017 respectively, and no glycosuria was detected. Albumen was absent in every case. In this respect, the disease may be contrasted with yellow fever, in which albuminuria is so distinctive a feature.

The duration of the disease ranged from four to seven days, though most of the cases were kept in bed for ten days, and the rash persisted at times for two or three weeks. Convalescence was rather protracted and a number of the patients complained of weakness persisting for some time.

The diagnosis would be readily made in an epidemic but would admit of some difficulty in sporadic cases. The sudden onset with headache; the flushing of the face and injection of the eyes and pharynx; the congested erythematous appearance of the back; the occurrence of the rash; and the condition of the pulse—all unite to form a more or less typical picture. Perhaps it would be necessary to differentiate the condition from influenza, fibrositis, and measles.

In all the cases recorded above, the toxæmia would appear to be slight, as, although the symptoms were well-marked, there was never any anxiety as to the ultimate complete recovery of the patient.

No case of infection occurred other than amongst the artificially inoculated.

Incidence

Incidence of Symptoms and Signs in the Thirteen Positive Cases.

Headache	...	...	...	...	...	...	...	...	11
Vomiting	...	...	...	...	...	...	...	...	2
Cough	...	...	...	...	...	...	...	...	4
Sleeplessness	...	...	...	...	...	...	...	...	4
Aching eyes	...	...	...	...	...	...	...	...	5
Rash	{	Preliminary	...	...	...	...	...	...	5
		Terminal	...	...	...	...	...	...	10
Flushing of face	...	...	...	...	...	...	...	...	12
Relative Bradycardia	...	...	...	...	...	...	...	...	13
Absolute Bradycardia	...	...	...	...	...	...	...	...	11
Typical Diphasic temperature chart	...	...	...	...	...	...	...	...	2
Irregular Diphasic temperature chart	...	...	...	...	...	...	...	...	4
Monophasic temperature chart	...	...	...	...	...	...	...	...	2
Irregular temperature chart	...	...	...	...	...	...	...	...	4
Relapsing temperature chart	...	...	...	...	...	...	...	...	1
Sweating	...	...	...	...	...	...	...	...	5
Pains	{	Aching muscle pains	...	...	...	...	...	...	8
		Joint pains	...	...	...	...	...	...	2
Anorexia	...	...	...	...	...	...	...	...	1
Marked weakness during convalescence - Several cases.									

TABLE showing Incidence, Date of Appearance, &c., of Rash.

Case No.	Date of Onset.	First Examination.			Later Rash.				Remarks.
		Date.	Day.	Rash.	Date.	Day.	Duration.	Intensity.	
4	19-4-16	20-4-16	2	+?	+	...	+	Neg.	Doubtful early erythema. No later rash.
6	16-4-16	17-4-16	2	Neg.	18-19 4-16	3, 4	11	+ S	Prodromal rash not noted. Slight later rash.
7	16-4-16	17-4-16	2	+S	18-4-16	3	6	+	Slight prodromal rash. Definite later rash.
9	19-4-16	20-4-16	2	+?	25-4-16	7	7	++	Doubtful prodromal rash. Marked later rash.
11	23-4-16	23-4-16	1	Neg.	24-4-16	2	11	++	No prodromal rash. Marked later rash.
12	25-4-16	25-4-16	1	+	27-4-16	3	17	++	Definite prodromal and marked later rash.
13	25-4-16	25-4-16	1	+S	27-4-16	3	11	+	Slight prodromal and definite later rash.
16	3-5-16	3-5-16	1	+?	+	...	+	Neg.	Doubtful early erythema. No later rash.
17	3-5-16	3-5-16	1	Neg.	7-5-16	5	5	+	No prodromal rash. Definite later rash.
25	21-5-16	22-5-16	2	Neg.	23-26 5-16	3, 6	11	+	No prodromal rash. Definite later rash.
26 (32)	11-6-16	11-6-16	1	Neg.	13-6-16	3	13	+S	No prodromal rash. Slight later rash.
27	1-6-16	2-6-16	2	Neg.	+	...	+	Neg.	No rash noted.
29	30-5-16	31-5-16	2	+?	1-6-16	3	15	++	Doubtful early erythema. Marked later rash.

Day = Day of Disease. + = Marked. + = Definite. +S = Slight. Neg. = Negative. +? = Doubtful.

(b) Consideration of Cases 1 to 9.

These cases, with the exception of Case 1, all received two injections of material separated by an interval of four days. Case 1 received only the first injection, but it is considered with these other cases because the material was the same as that used for the first injection in some of the other cases.

At the beginning of our work in connection with the experimental transmission of dengue from one case to another, our efforts were at first directed to establishing in Sydney transmitted cases of the disease by some means or other. Nine volunteers were secured who, for a consideration, submitted themselves on 8th April, 1916, to injections of material from the bloods of two natural cases of the disease which had occurred at Murwillumbah. Two or three days later the occurrence of a natural case of the disease at the Coast Hospital, in which the infection had been contracted in the North Coast district, gave us a further opportunity of obtaining infective material, though in this case the patient was convalescing, being in the eighth day of the disease. Material from this second source was injected on 12th April, 1916, into eight of the nine volunteers, who had received the first injection four days previously. As the results showed, it is to be regretted that in any case one individual received two separate injections within such a short interval of time. The difficulty of obtaining volunteers, together with the desire on our part at this stage of our work to obtain by any means that could be compassed a strain or strains of the disease in Sydney under our control, together with the belief at that time that the incubation period of about four days as given in the text-books was the correct one, and that

that therefore our first injections had failed to produce any result, all contributed to our using so many of the same volunteers for the second injection. Coupled with this was inadvertence on the part of the two of us responsible for the planning out of these experiments in not making it clear that it was advisable to make every possible endeavour to obtain new volunteers to supplement as possible previous ones.

The two injections, however, having thus been made with an interval of four days between them, it is necessary to consider what information can be reasonably gathered from the results obtained, either taken alone or taken in conjunction with the other experiments carried out by us. Considering the first injections made on 8th April, Cases 1 to 5 received subcutaneously 1 c.c. Pasteur-Chamberland filtrate from the citrated blood of the Natural Case A, taken on the third day of the disease at Murwillumbah. The citrated blood had been outside the body for three days previous to injection. Of these five cases, Case 1 received a first injection only, and developed no signs of illness whatsoever. Cases 2, 3, 4, and 5 received on 12th April 1 c.c. of citrated blood from the Natural Case C, taken on the eighth day of the disease. Cases 2 and 4 showed no symptoms of the disease at any time. Case 3 developed an illness of a doubtful nature beginning twenty-two days after the first injection, and eighteen days after the second injection. Case 4 developed an apparently definite attack of dengue of a mild type, eleven days after the first injection and seven days after the second injection.

Cases 6 and 7 received as their first injection serum and corpuscles taken on the third day of the disease of Natural Case B occurring at Murwillumbah, the material having been outside the body for four days. Four days later Case 6 received a subcutaneous injection of serum taken on the eighth day of the natural disease from Case C, whilst Case 7 received citrated blood from the same Case C. Cases 6 and 7 developed typical attacks of dengue twelve days after the first injection, and eight days after the second injection.

Cases 8 and 9 received on 8th April subcutaneous injections of clear serum obtained from blood taken on the third day of the natural disease from Case B at Murwillumbah, which material had been outside the body for four days. In addition, Case 8 received on 12th April citrated blood taken on the eighth day of the natural disease of Case C, whilst Case 9 received an injection of serum from this same Case C. Case 8 remained well throughout, whilst Case 9 developed a typical attack of dengue eleven days after the first injection, and seven days after the second injection.

On making a resumé of the above results we find that of the five cases injected with the Pasteur-Chamberland filtrate of the citrated blood of Natural Case A, three remained perfectly well throughout, Case 3 had an illness of a doubtful nature beginning twenty-two and eighteen days respectively after the injections, whilst Case 4 developed dengue eleven and seven days respectively after the injections.

Cases 6 and 7 injected primarily with the serum and corpuscles of Case B both developed typical attacks of dengue eight days afterwards, and four days after the second injection. Of Cases 8 and 9 injected in the first case with the clear serum of Case B, Case 8 remained well throughout and Case 9 developed dengue eleven days afterwards, and seven days after the second injection.

Of Cases 2, 3, 4, 5, 7, and 8 receiving as their second injections citrated blood from Case C, taken on the eighth day of the disease, Cases 2, 5, and 8 developed no disease. Case 3 developed a doubtful disease eighteen days after the second injection; and twenty-two days after the first, Case 4 developed dengue seven days after the second injection and eleven days after the first, whilst Case 7 developed dengue eight days after the first injection and four days after the second. Of Cases 6 and 9 injected secondarily with the serum of Natural Case C taken on the eighth day of the disease, Case 6 developed dengue eight days after the first injection and four days after this, the second injection, whilst Case 9 developed dengue seven days after this second injection, and eleven days after the first injection.

It is to be noted that in the only two cases, viz., Cases 6 and 7, receiving injections of the *serum and corpuscles from Case B*, both developed dengue eight days later, whilst their second injections consisted in the first case of serum from Case C, and in the second case of citrated blood from Case C. As the only other case (Case 9) which received serum from Case C as a second injection did not develop dengue until the seventh day after the injection, and as of the five other cases which received citrated blood from Case C as second injections, three remained quite well, one (Case 4) developed dengue seven days after this injection, and the remaining one developed an indefinite disease later, it is reasonable to infer that Cases 6 and 7 were infected with the material used in the first injection, giving an incubation period of seven days. If this view be correct it cannot be stated whether the second injections also contained infective material, as this would be masked by the positive results from the first injections. The other two cases in this series in which typical dengue developed had one common factor, viz., that they both received injections, in one case (Case 4) of the citrated blood, and in the other (Case 9) of serum, from Natural Case C as second injections. The disease appeared in each seven days later. That in this case it is reasonable to attribute the disease to the second injection and not to the first is shown by the fact that, as regards Case 4, of the four other cases receiving a similar *first* injection, three remained perfectly well, whilst the fourth developed an indefinite disease many days later; and that, as regards Case 9, the only other case receiving a similar first injection to this was Case 8, which remained well throughout. The only other case which received as a second injection serum from Case C was Case 6, in which the infectivity of this material may have been masked by the presumed infectivity of the material first injected.

As

As our further experimental results show, in no instance have we found an incubation period as low as four days, or as high as eleven days. On these results the development of dengue in Cases 6 and 7 must be attributed to the first injection, giving an incubation period of eight days, whilst the disease in Cases 4 and 9 must be attributed to the second injection, giving incubation periods of seven days.

(c) *Cases showing that the virus exists in the blood (serum or (and) corpuscles).*

Owing to the difficulty in preventing blood from clotting, and the necessity of doing a Wassermann reaction before injecting the blood from one person into another, no attempts were made by us to directly convey blood from one individual to another in its natural state. In certain experiments the serum and corpuscles of blood which had been taken and allowed to clot, were injected subcutaneously, whilst in other cases whole blood was received into citrate normal saline solution, and this, or certain portions of it, were injected.

It is unnecessary to labour the point that the virus exists in some constituent of the blood. The interesting point to ascertain is whether the virus exists in the serum or is in some way attached to the corpuscles. The following cases show that the virus is present in a mixture of serum and corpuscles from clotted infective blood, namely, Case 13, Case 26, Case 27, and Case 29. In Case 28 the result was doubtful, the only indication of a possible mild attack of dengue being a slight rise of temperature for a few days beginning on the fifteenth day. As noted in a special discussion on Cases 1-9 the positive results in Cases 6 and 7 we are inclined to attribute to the injection of mixed serum and corpuscles.

(d) *A case inoculated with whole citrated blood.*

If the positive result in Case 4 is to be attributed to the second injection consisting of citrated blood from a natural case of the disease taken on the eighth day of that disease (*vide* discussion on Cases 1 to 9), as is suggested by the length of the incubation period, then citrated blood as a whole, as might have been expected, is infective, and treatment with citrated normal saline solution is not injurious or at least lethal to the virus.

(e) *Cases in which the Serum of clotted blood was used for injections.*

Of four cases receiving this material, three gave positive results, and one a negative result.

In Case 11, in which a positive result followed, the blood was taken on the morning of the third day of the disease and was injected into the volunteer on the evening of the same day. A typical attack of dengue with its rash developed.

In Case 25, in which a positive result also followed, the blood had been taken on the second day of the disease and had been kept about eight days in an ice chest before injection. A typical attack of dengue fever resulted.

Case 9, which also developed a typical attack of dengue, received injections of serum, with an interval of four days between them, from two separate sources. Case 8, in which a negative result was obtained, received the same first injection of serum as Case 9, and four days later a second injection consisting of citrated blood from a different case of the disease. No ill effects followed. From these results in Case 8 we attribute the positive result in Case 9 to the second injection of serum, the second injection in these cases being the factor in which they differed.

(f) *Cases showing the experimental results with Washed Corpuscles.*

Three cases each received a subcutaneous injection of washed corpuscles from cases of dengue. The corpuscles had been obtained by withdrawing blood from a vein and injecting it immediately into a solution of citrate of soda in normal saline solution. Thereafter the mixture was centrifuged, the supernatant fluid pipetted off and the deposit of corpuscles shaken up with fresh normal saline solution and re-centrifuged. This was repeated from four to seven times. With such material two cases gave negative results, and one a not quite conclusive positive result. In Case 10, giving a negative result, the blood had been taken on the third day of the disease, and the corpuscles were injected into the volunteer within twelve hours of removal. Serum from this case derived from the same sample of blood gave rise to a typical attack of dengue fever (Case 11), showing that the blood at this period was infective.

In Case 14, which was also negative, the blood was taken on the fourth day and injected into the volunteer the succeeding day. The citrate washings from this case, as detailed later, also gave a negative result in Case 15.

In Case 16 an apparently positive result followed. This blood was taken on the second day of the disease and injected into the volunteer on the following day. This illness was a mild one beginning about five days and twenty hours after injection. The patient's appearance and symptoms were those of a mild attack of dengue fever; the temperature reaction was mild, and there was no definite rash. In our opinion the case was a mild one of dengue, though it must be considered as open to considerable criticism.

As inoculation of other material shows that blood still remains infective on the third (and fourth) days of the disease, the failure of the washed corpuscles to produce the disease in Cases 10 and 14 and an apparently successful result in Case 16 cannot be considered as dependent on Cases 10 and 14 receiving blood from patients in the third and fourth days of the disease respectively, whilst in Case 16 the patient was only in the second day of the disease. These anomalous results seem rather to indicate that the

virus is not of necessity intimately associated with the corpuscles, though it may temporarily adhere to them and be sometimes successfully removed by thorough washing. In other words, these results tend to support the view that the parasite, whatever it is, is not intra-corpuscular. If Case 16 be rejected as being a mild case of the disease, this view is still more strongly supported. On the other hand, if Case 16 be considered a mild case of the disease, the mildness compared with the very definite attack in Case 17, which received the citrated plasma from the same blood, may be considered as showing that the virus may become attached loosely to the surface of the corpuscles from which by washing it may be to some degree detached though sufficient virus may still adhere to produce a mild attack of the disease.

(g) *Cases in which the fluid part of citrated blood was injected.*

In these cases the blood was received into citrate normal saline solution and then centrifuged. The supernatant fluid was then pipetted off and used for injections. As the centrifuge used was not of very high speed, it cannot be considered certain that the fluid injected was free from corpuscles, though these must have been reduced to a minimum. Of two cases receiving these injections, one gave a typical positive result and one a negative one.

Case 17 (a positive result) followed the use of material obtained on the second day of the disease. Case 16, which received the washed corpuscles of the same blood, developed apparently a mild attack of dengue. Thus the washings of the corpuscles from Case 13 gave a very definite attack of dengue fever in Case 17, as compared with the mild, somewhat doubtful, attack resulting from the washed corpuscles in Case 16.

Case 15 gave a negative result. The material in this case was received from Case 11 on the fourth day of the disease. The washed corpuscles from the same blood also gave a negative result in Case 14.

(h) *Cases in which a Pasteur-Chamberland Filtrate of the serum and corpuscles obtained from clotted blood was injected.*

Of the five cases in which such a filtrate was inoculated subcutaneously, four gave a negative result and one a positive one.

Case 12, which gave a positive result, was injected with the filtrate of the clot and serum obtained from blood taken on the second day of an attack of dengue. It was injected the day after collection, and was followed by a typical attack of dengue. Unfortunately, in this case, a test was not made of the reliability of the candle used by inoculating the serum beforehand with a suspension of *B. prodigiosus*. The untreated serum and clot likewise gave a positive result.

Case 18, which was negative, received the filtrate of the clot and serum from blood taken on the fifth day of a severe case of dengue, the blood having been kept on ice for four days before filtration and the material used on the sixth day from the time of collection.

Case 19, which was negative, received a filtrate of the serum and clot from blood from a case in the fourth day of the disease, the blood being taken one day and the filtrate injected two days later. A local reaction of the arm followed the inoculation, but no attack of dengue.

Case 20 received a filtrate of the serum and clot from blood taken within forty-eight hours of the onset of an attack of dengue and injected eight days later, having been kept on ice meanwhile. The result was negative.

Case 21, which was negative, received an injection of the filtrate of the serum and clot from blood taken within forty-eight hours of the onset of an attack of dengue, but which was kept in an ice-chest for eight days before injection.

In Cases 18, 19, 20 and 21 the efficacy of the Pasteur-Chamberland filter was tested by its withholding *B. prodigiosus* added to the serum and clot before filtration.

As regards these negative cases, Case 19 received the filtrate from Case 11. Cases 14 and 15 received respectively washed corpuscles and the citrated washings of these corpuscles from the same case and from the same sample of blood. Both of these cases also gave a negative result. This blood was taken on the fourth day of the disease in Case 11. These three negative results would seem to indicate that the blood of this case on the date in question was non-infective.

In Case 18 the blood was taken on the fifth day of the disease, and there were no other cases inoculated with other samples of this blood to show whether it was still infective.

In Case 20 the blood was taken at a very early period of the disease, a period during which we know that it is infective. It was kept outside the body at a low temperature for eight days. In this case the length of time for which the material was kept outside the human body may have tended to destroy the virus, although from Case 25 we know that the virus can, in some cases at least, survive such a period of time. The negative result, therefore, in this case may be considered to be of some significance.

Similar remarks apply to Case 21. In this instance we know that the blood from which the filtrate was taken was infective on the date on which it was removed, as evidenced by the positive results obtained in Cases 16 and 17.

(i) *Cases in which a Pasteur-Chamberland Filtrate of the citrated blood was injected.*

Cases 1 to 5 received injections of a Pasteur-Chamberland filtrate of citrated blood, taken on the third day of the disease and kept outside the body for three days before inoculation. In addition to this inoculation, Cases 2 to 5, four days later, each received

a second inoculation of material from another dengue case. Cases 1, 2 and 5 remained perfectly well; Case 4 developed a typical attack of dengue eleven days after the first injection and seven days after the second injection. As detailed under "Consideration of Cases 1 to 9," we attributed the successful result in this case to the second inoculation, and believe that the filtrate of citrated blood failed to convey infection. In Case 3 an illness developed twenty-two days after the first inoculation and eighteen days after the second inoculation. We are not prepared to say whether this disease was or was not an atypical form of dengue. If the disease was dengue, infection could as reasonably be attributed to the second injection as to the first. It therefore appears that none of the five cases injected with the Pasteur-Chamberland filtrate from Natural Case A could, with any reasonable certainty, be considered as having received the infection from this source. This failure to convey the disease might result either because the blood from Natural Case A was not infective at the time it was withdrawn, or that it lost its infectivity during transit and before inoculation, or that the filtration process separated the virus from the filtrate.

(j) *Cases showing the presence of the virus in the blood on certain days of the disease.*

The presence of the virus on the second day of the disease is demonstrated by the results in Cases 12, 13, 16, 17, 27.

That the virus is present on the third day of the disease is shown in Cases 11, 25, 26 (32), 29. If the positive results in Cases 6 and 7 are to be attributed to the first injections (*vide* Discussion on Cases 1 to 9), they also show that blood is infective on the third day.

If the results in Cases 4 and 9 are to be attributed to the second injection (*vide* Discussion on Cases 1 to 9), then the infective material may still be present on the eighth day of the disease.

(k) *Case apparently showing the absence of the virus after recovery from the disease.*

Case 31 received an injection of serum and corpuscles on the fourteenth day after the beginning of the illness of B.B. No symptoms followed. Unfortunately, we were unable to inoculate this case later with an active virus.

(l) *Case showing the Establishment of Immunity shortly after recovery from an attack of Dengue Fever.*

Case 13 received a subcutaneous injection of serum and corpuscles on 18th April, 1916, became suddenly ill on 25th April, and passed through a typical attack of dengue. The temperature reached normal on 29th April, but the rash had not completely faded until 8th May.

On 2nd June, 1916, he was reinjected subcutaneously with .5 c.c. of serum and corpuscles from the case of "B.B." who contracted the disease through mosquito bites. Case 13 now became Case 30.

On the same date (2nd June), a non-immune (Case 26-32) received an exactly similar injection from the case of "B.B." Case 30 remained unaffected as a result of his injection, while Case 26 (32) went through a typical attack of dengue beginning on 11th June. Though it must be borne in mind that it cannot be considered as established that the subcutaneous injection of infective blood from a case of dengue will certainly produce in a non-immune individual an attack of dengue fever, the results obtained in Case 30 point strongly to the view that his failure to develop the disease after an injection of serum and corpuscles known to be infective, was due to his having recently passed through a typical, though artificially produced, attack of the disease. The subcutaneous injection of the new infective material occurred forty-five days from the day when he received his first injection of infective material; thirty-eight days from the onset of his typical attack; thirty-five days from the time when his temperature practically reached normal after this attack; and twenty-four days from the date on which the rash had disappeared and he was feeling well again—a period at which a definite measure of immunity may reasonably be considered to have been established.

From the results in Case 30 it may, therefore, be deduced with the qualification referred to above that an individual may be completely immune to the virus of dengue fever introduced subcutaneously after a period at least of twenty-four days, say one month, after complete recovery from a typical attack. One cannot say from this experiment that re-infection at an earlier period might not be effective. In other words a definite time may have to elapse before the establishment of any real immunity. We have no precise information on this point. Again how much longer after such an attack this complete immunity remains, is a subject for further investigation. This result is in accordance with the clinical experience of epidemic dengue, namely, that persons who have recovered from an attack are unlikely to suffer from a second attack during the epidemic in spite of the continuance of cases amongst non-immunes several months after these individuals had passed through their attack. There seems, however, some clinical evidence available that occasionally specific individuals may suffer from more than one attack of dengue during the prevalence of an epidemic. There seems little evidence to show that such immunity exists for periods of time to be estimated in years, inasmuch as victims of one epidemic may be also victims of an epidemic occurring some years afterwards. The rarity, however, of an epidemic occurring in the same area in the immediately succeeding year suggests that some measure of immunity extends over this time.

Case

Case 30 would seem, therefore, to show, as does clinical experience, that recovery from the disease is associated with an immunity to the disease which probably is the main factor in recovery, and that such recovery is not due of necessity to the organism having completed its life cycle in the human host, though still remaining in this host as a commensal parasite harmless to it but infective to the mosquito. Though it is possible that this may actually be the case, the introduction of further infective material, containing a virus which had not yet completed its possible cycle in the human host, failing in this case to convey the disease, and the clinical experience of immunity to the disease during an epidemic, both point to the view that such an immunity is established, and that it probably plays an important part in recovery from the disease.

(m) *Cases showing that the blood can retain its infectivity outside the body for varying periods.*

For 1 to 2 days.—In two of our positive cases (11, 32), the virus was outside the body less than one day. In two of the doubly injected positive cases it was also outside the body less than 1 day (4, 9). In four cases the virus was outside the body 1 day (12, 13, 16, 17). In one case 2 days (29). Thus in 9 of our positive cases the virus was outside the body less than 2 days.

For 4 days.—If the successful results in Cases 6 and 7 are to be attributed to the first injection (*vide* consideration of Cases 1 to 9), then the virus can exist without losing its infective properties for a period of four days outside the body at a mild early autumn temperature such as it was exposed to in transit from Murrumbidgee to Sydney. Also in Case 27 the material was kept cool in an ice-chest for four days before inoculation.

For 7 days.—In Case 25 the material was kept in an ice-chest for seven days before inoculation.

From the above we can conclude that the infective agent of dengue fever can survive in the blood outside the body for a period of four days and, sometimes at any rate, longer, viz., up to seven days.

Further work should be done upon this aspect.

(n) *Cases showing the length of the incubation period of the inoculated disease.*

From 5 to 6 days.—

Case 16.—5 days, 20 hours.

„ 17.—Under 6 days (to onset of fever; 7 days to onset of other symptoms).

„ 29.—4 days, 21 hours to first symptoms; 6 days 8 hours to taking to bed.

From 6 to 7 days.—

Case 9.—6 days, 16 hours (if attack attributed to second injection; 11 days if attributed to first infection).

„ 12.—6 days, 14 hours.

„ 13.— „ „

From 7 to 8 days.—

Case 27.—7 days, 21 hours.

From 8 to 9 days.—

Case 6.—8 days, 3 hours (if the disease were due to the first inoculation; just over 4 days if due to the second inoculation, *vide* Consideration of Cases 1 to 9).

„ 7.—7 days, 20 hours (if the disease were due to the first inoculation; just over 4 days if due to the second inoculation—*vide* Consideration of Cases 1 to 9).

„ 11.—8 days 13 hours.

„ 25.—9 days.

„ 26 (32).—8 days, 12 hours.

(o) *Is the length of the incubation period dependent on the strain of the virus or on the susceptibility of the patient or on both?*

We have found by the inoculation of blood and by our mosquito-fed cases that the incubation period of the disease may vary from a little over five days to nine days. The question arises as to why such a variation exists. It is well known in most diseases that such a variation of several days between the shortest known incubation period and the longest known incubation period does exist.

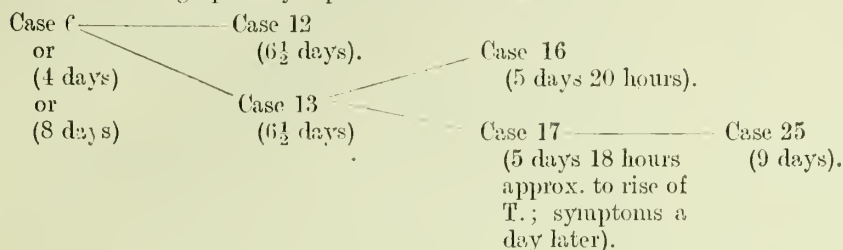
Are such variations due to mutational differences in the virus, to greater or less resistance in the patient, or to differences in the amount of infective material originally received?

It can be at once understood that a dose of the infecting organism not much above the minimum might result in a prolonged incubation period owing to the longer period perhaps required for the organism to multiply sufficiently to produce symptoms and signs.

Provided however that the dose is a reasonably large one is there any evidence to show that the incubation period will vary with the virus or with the susceptibility of the patient?

The results in Cases 12 and 13 and in Cases 16 and 17 would seem to suggest that the same virus in a sufficient dose tends to produce a disease with approximately the same incubation period. Case 12 received a Pasteur-Chamberland filtrate of clot and serum

serum from blood taken on the second day of an attack of dengue (Case 6) whilst Case 13 received the untreated serum and corpuscles of the same blood. Both were inoculated at the same time and both developed the disease contemporaneously six and a half days later. In Case 16 the volunteer received an inoculation of washed corpuscles and in Case 17 the plasma in citrate normal saline solution, the blood in both cases being derived from the same patient (Case 13.) The two cases received their inoculations within fifteen minutes of each other and Case 16 developed dengue fever five days and twenty hours later whilst Case 17 developed the disease, as indicated by a rise of temperature alone, apparently a few hours earlier (the exact time has not been noted). Case 25 inoculated from Case 17 had an incubation period of nine days. This sequence of cases can be graphically represented as follows :—



An examination of this series of cases seems to show that the same virus during its passage through a series of individuals may produce illnesses with varying incubation periods of from $6\frac{1}{2}$, possibly 4 days, to 9 days, but that if the virus be taken at any particular moment and injected into two individuals, it may result in practically identical incubation periods. In other words it would seem that the length of the incubation period is determined more by the state of the virus than by the state of the patient. It should be noted further that the menstrum in which the virus was obtained varied somewhat in the individuals of each pair, so that presumably different doses of the virus were received by the individuals of each pair.

In considering these results, however, due consideration must be given to the fact that only two instances of equal incubation periods are dealt with, and that in case 17 the temperature rose nearly a day before any symptoms were manifested so that the early incidence of the disease would have been overlooked had the temperature not been taken. The results, however, indicate that further work might very well be carried out to ascertain whether the hypothesis suggested is one of general applicability or not.

(p). *Case Sequences in Relation to Immunity.*

Under this heading are included those instances in which the particular virus has been passed in succession by inoculation from one individual to a second, from the second to a third, and so on. The following is an instance of such successful sub-inoculations :—

In Case 6 the virus was present on the second day of the disease as proved by successful sub-inoculations into Cases 12 and 13. From Case 13 further successful sub-inoculations were made from material taken on the second day of the disease and injected into Cases 16 and 17. From material taken from Case 17 on the third day of the disease, a further successful sub-inoculation was made into Case 25. In this particular series we have been successful in conveying the disease by inoculation and sub-inoculation consecutively into four individuals. The virus from which Case 6 was inoculated was presumably obtained from the blood of Case "B" on the third day of the natural disease (possibly from that of Case "C" on the eighth day); thereafter in Cases 13 and 17 the virus was obtained from bloods taken on the second and third days respectively of the inoculated disease, and in Case 25 from blood taken on the third day. We thus see that this virus, by the time it reached Case 25, had produced in human beings the following days of disease, namely $3 + 2 + 3 + 3$, without the virus having passed through any stage of its life history in the intermediate host, the mosquito. When it reached Case 25 it was capable of producing a disease in this patient lasting five days, followed nine days later by a relapse lasting another five days. In other words this virus produced in human beings without going through any phase in the mosquito, sixteen days of fever followed by a relapse of five days of fever. It may be further noted that the disease in Case 25—the end of the series—was as pronounced as in the first case of the series, showing that there had been no definite attenuation of the virus. Between the various inoculations, this virus had been outside the human body for four days (presumably) before inoculation into Case 6: for one day between Cases 6 and 13; for one day between Cases 13 and 17; and for eight days between Cases 17 and 25; that is to say, that during the period covered by the sixteen days of fever, the virus itself had been outside the human body for a period of fourteen days. The incubation periods of the disease in the four cases forming the series are respectively $8, 6\frac{1}{2}, 6$ and 9 , making a total of $29\frac{1}{2}$ days. We now get the following totals in connection with this virus when inoculated in series, namely sixteen days of fever, fourteen days outside the body, and twenty-nine and a half days incubating in the body before manifesting the disease. The total number of days obtained by adding these together is $59\frac{1}{2}$, whereas we find that the virus left the original case on April 4th and had completed the primary attack of dengue in Case 25 on 26th May, giving a total of only 53 days. The discrepancy is easily

easily explained, inasmuch as incomplete days have been taken as full days in estimating the period outside the body, the days of the disease, and so on. As a matter of fact, therefore, the figures 16, 14 and $29\frac{1}{2}$, more particularly the two former, are each higher than they should be, probably by a day or a little more. The relative proportions, however, still remain. We thus find that in our series in which the virus was passed from individual to individual over a period of fifty-five days, roughly one-fourth of these days was spent outside the human body, a second quarter was occupied by the virus in producing manifest disease, and in about half of them the virus was incubating in the human body. What information can be gathered from these results? The natural disease produces in its victim an illness definitely lasting from five to seven days followed by convalescence. Does the fever end after the five to seven days of illness because the virus has gone through a phase of development and has now reached a stage, ready for transmission to another (invertebrate) host, but no longer capable of producing a reaction in the human host; or has the fever subsided because the human host has been able to combat successfully and overcome the virus and its poisons?

Apart from the question as to whether dengue is usually only infective for the mosquito or by inoculation to other human beings during the first three days of the disease (this point is still undecided), the results obtained in this series would seem to indicate that the latter and not the former view is the correct one. If the virus requires seven days to complete its phase of development in the human body, then sub-inoculations in a series of individuals should fail at the end of an aggregate of seven days' fever, whereas in our series we were able to produce fourteen days of fever followed by a relapse. The objection, of course, may be raised that withdrawal of the blood and keeping it for varying periods of time outside the body, associated with the necessary incubation periods, so interfere with the maturation of the virus in the human body, that a considerably longer period might be required for it to thus mature than would be the case could complete maturation occur in one individual. The balance of evidence, however, seems to be in favour of the view that the patient recovers from his attack of dengue because of his protective reaction against the virus rather than that the virus, having passed through and completed a phase of its existence (viz., that productive of disease in man), still remained in the human host as a commensal no longer capable of producing disease in the human host, though, perhaps, capable of infecting mosquitoes (= gamete formation in malarial organisms).

The accompanying chart (A) represents graphically the history of the virus. The horizontal lines indicate in days the presence of the virus in human beings, whilst the vertical lines indicate similarly the presence of the virus outside the human body *in vitro*. Days thus — indicate that on these dates the virus was causing disease in the human victim, whilst days thus --- indicate that it was incubating or had ceased to manifest its presence unmistakably in the human case.

(q) *Can the disease be conveyed by an application of serum to a scarification?*

In Case 22 the arm of the volunteer was scarified as for an ordinary vaccination with calf lymph, and the mixed sera from Cases 16 and 17 were rubbed into the scarified area. The sera were obtained from blood from these cases taken on the third days of the inoculated diseases, and at least in Case 17 we know, by the successful inoculation of Case 25, that the virus was present in the material. The result in this case was very doubtful. The patient showed occasional slight signs and symptoms and a slight rise of temperature, which may have been due to his passing through an exceedingly mild attack of dengue fever. Such a result might perhaps be anticipated if a very mild dose of the virus gained entrance to the human host.

Can the disease be conveyed by an application of infective material to the nostrils?

In Case 23 the nostrils were swabbed with the mixed sera of Cases 16 and 17 obtained from blood taken on the third days of the inoculated diseases, and which we know, in the case of Case 17 at least, to be infective, as proved by the successful inoculation of Case 25. The result must be considered as negative, though some very slight symptoms were manifested which may possibly have some significance.

Can the virus be conveyed by the ingestion of infective blood?

As various infectious diseases have been thought at times to be possible of conveyance by the ingestion of infective material, it was thought of interest to see whether gargling the throat and then swallowing a neutral mixture containing infective dengue blood would result in an attack of dengue or not. If in such cases the infection occurred through the pharynx, gargling would facilitate the entrance of the organism; whereas if infection occurred through the stomach or lower down the alimentary canal, swallowing the blood should achieve the result sought. In Case 24 the mixed sera of Cases 16 and 17, which we know contained the virus, were added to a neutral mixture, and the throat gargled with this, and the material then swallowed. He developed a doubtful but rather suggestive illness, and though his case cannot be considered as being definitely one of dengue, it is nevertheless very suggestive of a mild attack.

In Case 26 blood was similarly used as a gargle and then swallowed, but this blood had been taken from Case 25 on the fourth day of the inoculated disease, and we have no proof by means of other inoculations that it was at this period infective. Case 26 did not develop within the ordinary incubation period any symptoms definitely suggestive of an
attack

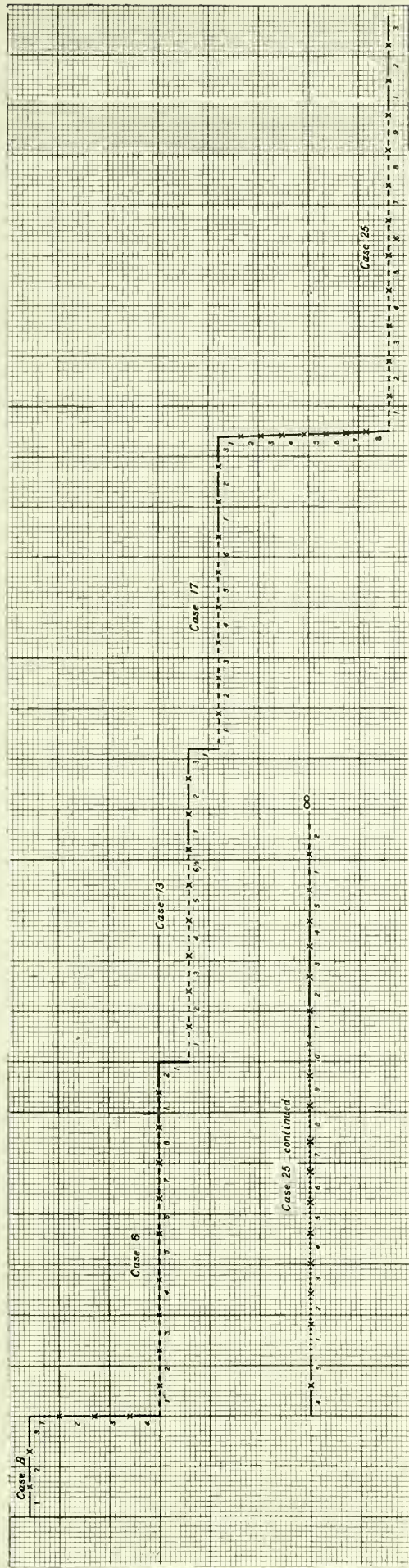


CHART A.

Case sequences. The Chart illustrates part of the history of the virus obtained from Natural Case B.

The horizontal lines indicate in days the presence of the virus in human beings, whilst the vertical lines indicate similarly the presence of the virus outside the human body *in vitro*. Days thus ——— (horizontal) indicate that on these dates the virus was causing disease in the human victim, whilst days thus - - - (horizontal) indicate that it was incubating or had ceased to manifest its presence unmistakably in the human case.

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attack of dengue. In this case the result is somewhat obscured by his receiving subsequently a subcutaneous inoculation of infective material which did produce a typical attack of dengue. It therefore seems clear that, at any rate, the gargling and the swallowing of the blood did not produce any protective bodies which prevented the patient developing a typical attack by subsequent inoculation of infective material.

(r) *Speculations on a possible relationship between certain insect-borne diseases and the acute exanthemata.*

In carrying out our experiments on the various ways by which the virus of dengue can be conveyed to human beings, we had in mind the possibility of light being thrown on the relationship such insect-conveyed diseases as yellow fever, pappataci fever, and dengue fever, might bear to such diseases as measles, german measles, and scarlet fever.

If the ordinary means of transmission of these six diseases were not known, dengue fever with its rash might be quite well allocated to a group which would include also measles, german measles, and scarlet fever, all characterised by well-marked eruptions. The clinical course of yellow fever and pappataci fever, even though these are not accompanied by rashes, would also incline one to associate them with the four others.

The intensely infectious nature of measles, german measles and scarlet fever has been known presumably from time immemorial, infection being produced without the intervention of any intermediate host. With the discovery that the organism of yellow fever was under ordinary circumstances introduced into the human victim by a particular mosquito in which obviously such organism had undergone a particular phase of its development, it at once seemed highly likely that this disease had a phylogenetic history widely different from that of the organisms responsible for the acute exanthemata mentioned above. Later the organism of pappataci fever was found to possess a complicated life history similar to that of the organism of yellow fever, and now it is clear that dengue must also be placed in the same category. Is it possible that the differences separating these two groups of infective diseases are not so great as at first sight may appear to be the case, or are they really as great as at first might be supposed? A critical consideration of the question requires a wide view-point.

In trypanosome infections of warm blooded animals there is good ground for supposing that the parasites were at one time of their phylogeny inhabitants of the guts of invertebrates. In many species of invertebrates flagellates allied to the trypanosomes are numerous in the alimentary tract. Infection of further insect hosts occurs from infection of food, &c., by the faecal deposits of infected individuals. There is reason now for thinking that vertebrate hosts have become infected with trypanosomes through the introduction into the wounds made by the various invertebrates such as leeches, bugs, and biting flies, of flagellates infesting the alimentary tracts of these invertebrates. At first such infections were probably contaminative by faecal material from the invertebrate being rubbed into the wound by the vertebrate. In most instances it is probable that the flagellates thus introduced into the wound were unable to survive in their new surroundings. In some instances, however, they were presumably able to maintain an existence in this situation and even multiply, and possibly dermal leishmaniasis is an instance in point. It is probable, however, that in some instances flagellates were not only able to live at the site of inoculation, but also found that the circulating fluid of the blood of the vertebrate host offered them conditions suitable for further multiplication. Multiplying in this way in the blood, they offered to the species of invertebrate responsible for the original infection further opportunities for the infection of other individuals ingesting the blood of the infected vertebrate. In this way a flagellate originally a parasite of invertebrates alone may and probably did acquire a double life history passing certain phases of development in the invertebrate host and other phases in the vertebrate host. The flagellates being thus established in the blood of vertebrate hosts possibly occasionally infected further vertebrate hosts through wounds without the flagellate having undergone the usual phase of development in the invertebrate. Such instances of direct infection would probably be rare, but when it happened that the flagellates not only lived in the blood but also "exuded" so to speak through a mucous membrane, as for instance that of the vagina, further opportunities of direct infection of vertebrates might present themselves. Apparently this has occurred in the trypanosome disease, dourine, of horses, in which infection occurs through coitus. In this particular disease the intermediation of an insect host seems now unnecessary for the perpetuation of the disease, so that looked at from a superficial point of view it might almost be thought that dourine belonged to a different class of infection from those other trypanosome diseases requiring the aid of an intermediate host.

As further support to the view that invertebrates were the original hosts of the parasitic flagellates may be instanced the infection of the latex of certain Euphorbias by flagellates derived from plant bugs. The plant bugs feeding on the Euphorbias introduce flagellates which flourish in the latex, and in this way infect further bugs. The analogy in this case with the trypanosome infections of vertebrates seems close.

In yellow fever, pappataci fever, and dengue fever are similar processes at work as in the case of these flagellate infections? Is it possible that measles, german measles, and scarlet fever, are a still further stage of this process in which, as in dourine, an invertebrate host is no longer necessary? If this latter question can be answered in the affirmative then the study of dengue may throw a very great light indeed on the etiological processes at work in the acute exanthemata. Dengue being a mild disease and easily conveyed to human beings presents opportunities for study that are doubtfully justifiable in the case of the more severe exanthemata.

For

For the purposes of convenience we will refer to the "yellow fever group" as comprising yellow fever, papataci fever, and dengue fever, and to the "measles group" as comprising measles, german measles and scarlet fever. The yellow fever group may be considered as due to organisms originally parasites of certain insects from which by originally contaminative methods, as in the trypanosomes, they have become pathogenic to human beings and multiply in the blood of infected individuals, or on the other hand the organisms of the yellow fever group may have evolved through countless ages as parasites of vertebrates before they were able to establish themselves in blood-sucking insects attacking these vertebrates. Having been ingested, however, by such biting insects certain strains might have been able to live and multiply in their new environment and to establish themselves in such situations in the new insect host as would enable them from time to time to regain a vertebrate host. In such a way a double life history might again be obtained, certain phases being passed in the original vertebrate host and certain others in the new invertebrate host. It is obvious that this interpretation is the converse to that illustrated by the flagellates, and it is also clear that one or other of these two solutions must be the correct one. These parasites whatever their nature must originally have been confined either to the vertebrate or to the invertebrate host, as it cannot be imagined that they could have evolved from non-parasitic types in such a way as to infect both hosts simultaneously.

From the foregoing it would seem that a study of dengue may be considered likely to throw light upon the measles group—(1) if the yellow fever group is due to organisms primarily parasites of vertebrates and secondarily parasites of invertebrates, or (2) if the measles group is due to organisms primarily parasites of invertebrates, secondarily of vertebrates and invertebrates, and finally of vertebrates alone, the invertebrate phase being dropped.

The invertebrate phase can be dropped supposing the organism escaped on to some free surface such as that of the nostrils or pharynx, and from this situation could be transported to further human beings on droplets of mucus or by other means, thereby infecting new individuals. With the establishment of such a means of direct infection the necessity for an insect vector would disappear. It was primarily with this object in view that certain experiments with infected dengue blood were carried out to try and ascertain whether the virus could be introduced into new individuals by swabbing the nose with the infective blood or by swallowing this. The results were, however, apparently negative.

Of course it must be realised that even if one or other of the above alternatives was correct this does not necessarily establish a close phylogenetic relationship between all these various diseases. It may still be that the organisms are as far sundered as the plague bacillus from the malarial plasmodium; nevertheless in our present stage of knowledge the views suggested are worth consideration as helping to clarify our views.

(s) *The relationship of Dengue to Yellow Fever.*

The various text-books on tropical medicine call attention to the necessity for differentially diagnosing dengue from yellow fever and *vice-versa* in places where these diseases co-exist. Neither of us has seen a case of yellow fever, and so are handicapped in considering this aspect of the question. From descriptions, however, it appears that a mild attack of yellow fever may be hard to differentiate from an attack of dengue in the absence of a rash. Castellani and Chalmers state that yellow fever can be differentiated from dengue by its slower pulse, jaundice and hæmatemesis. From our experience of the clinical disease and of inoculated cases, we have found that a pulse relatively and absolutely slow may occur in cases of dengue, and that therefore this point may not be of material help in a doubtful case. The occurrence of jaundice would be of considerable importance, but we have heard of occasional instances of slight jaundice occurring in dengue patients during the recent epidemic. We have not heard of any cases of hæmatemesis, but have noted that vomiting has been a sign in some cases of the disease.

We find that the incubation period of the mosquito-conveyed disease and of the inoculated disease in dengue varies from about five to nine days. In yellow fever the incubation period is said to vary from two days twenty-two hours to six days two hours.

We find that the virus of both yellow fever and dengue is transmitted by the same mosquito, *Stegomyia fasciata*.

This review shows that there are strong points of resemblance between dengue and yellow fever, and slight but definite points of difference. Dengue usually has a definite rash—yellow fever has none. Jaundice and hæmatemesis are characteristic of yellow fever. The incubation period of dengue is slightly longer than that of yellow fever. The close similarity, however, between the two diseases, and the fact that they are both transmitted by the same mosquito, suggest that they have been derived from a common stock in bygone times, and that one or other or both are mutations from such a common stock, just as it is reasonable to conclude that chicken-pox and smallpox are also derivatives from another common stock.

APPENDIX I.

DETAILS OF NATURAL CASES OF DENGUE FROM WHOM INOCULATIONS WERE MADE.

Case A.—Mr. P., Murwillumbah. He first became ill on 3rd April, 1916, and was in the midst of a typical attack of dengue with a temperature of 102 deg. F. when blood was taken from him at 11 a.m. on 5th April, 1916. Portion of this blood was injected into citrate

citrate normal saline solution, and part was allowed to clot and the serum then separated and sealed. The Wassermann reaction applied to an inactivated portion of the serum proved negative. Owing to contamination, the citrated serum could not be used for inoculation purposes on arrival in Sydney. A Pasteur-Chamberland filtrate from the citrated blood was used for inoculation purposes in Cases 1 to 5. Cases 1, 2 and 5 remained perfectly well. Cases 2 to 5 received a second inoculation of material from natural Case C four days after the first injection. Case 3 developed an illness of doubtful nature, beginning 22 days after the first injection and 18 days after the second. Case 4 developed an attack of dengue 11 days after the first injection and 7 days after the second. As indicated in our summary of Cases 1 to 9, each of which received two injections, we are inclined to consider that the infection in Case 4 was derived from the second injection and not from the first. This view is chiefly founded on the length of the incubation period.

Case B.—Mr. H., Murwillumbah. This patient was taken ill on 2nd April, 1916. He had pain in the back and down the legs and felt "squamish" at times. He had had no vomiting. When seen on 4th April, 1916, he was in the midst of a typical attack of dengue with a temperature of 102 deg. F. One eye was congested. His wife at this time was also ill, her attack of dengue having begun on 30th March, 1916, with pains in the back; she also vomited up her dinner. On 31st March, 1916, she felt very sick and had pains in the back and down the backs of the legs, shooting in character, and a sore throat. On 1st April, 1916, she was very sick and had a rash. When seen on 3rd April, 1916, her tongue was clean, with a temperature of 98.4 deg. She was covered with a punctate scarletiform rash, her hands being also covered with a marked rash. Blood was taken from the husband on 4th April, 1916, and divided into three portions, one being injected into citrate normal saline solution, a second being allowed to clot when the serum was separated and sealed in a tube, whilst the Wassermann test was applied to an inactivated portion of serum with a negative result. The clotted blood from which the serum had been extracted from this case was also kept.

On arrival in Sydney, the citrated blood was found to be contaminated. Cases 6 and 7 received injections from the mixed serum and clot, whilst Cases 8 and 9 received injections of the clear serum. These four cases four days later also received injections of material from Natural Case C. Cases 6 and 7 developed attacks of dengue eight days after the first injection and four days after the second. As indicated under our review of Cases 1 to 9, we attribute infection to the first inoculation, that is, to material from Natural Case B. Case 8 remained perfectly well, but Case 9 developed an attack of dengue 11 days after the first injection and 7 days after the second injection. In this case we are inclined to attribute the infection to the second inoculation.

Case C.—E.S. was a patient who had left a dengue district to enter the Coast Hospital, Sydney, to undergo an operation. On arrival at the Coast Hospital he was found to be recovering from an attack of dengue, which had been contracted in the endemic area. The history of his movements prior to arrival at the hospital is as follows. He left his home at Tyalgum at 9 a.m. on 31st March, 1916; arrived at Murwillumbah at 1 p.m. the same day, and had dinner and stayed the night at a boarding-house, leaving by the 6.20 a.m. train for Lismore on 1st April, 1916. He had dinner at Lismore and left for Coraki at 2 p.m. by boat, arriving there at 5 p.m. He stayed at a boarding-house in Coraki from the afternoon of the 1st until the 4th April, when at 7.30 p.m. he left by boat for Sydney. On 4th April, 1916, before leaving Coraki, he had a nasty languid feeling which he could not understand. To get over this feeling he went for a long row in the afternoon, and felt well whilst taking this exercise, but as soon as he got back and became cold again the same languid feeling recurred. He could not account for this feeling until about 9 p.m. the same night, on board the steamer at sea, when his eyes began to burn and his bones began to ache. He gradually grew worse until he reached Sydney about 2 p.m. on 6th April, 1916. He stayed at the People's Palace in Sydney until admitted to the Coast Hospital at about 3 p.m. on 10th April, 1916, when he felt in a much improved condition, but was a week in bed at the hospital. He states that whilst at the boarding-house at Murwillumbah he was bitten on the back of the left wrist by a mosquito, and that there was also a dengue patient sleeping in the next room.

On 11th April, 1916, blood was taken from this patient and portion was placed in citrate normal saline solution and portion was allowed to clot and the serum separated. Next day Cases 2, 3, 4, 5, 7 and 8 received injections of the citrated blood, and Cases 6 and 9 of the serum. All these cases had four days previously received injections of material from Natural Cases A or B. Of the cases injected with citrated blood, Case 3 developed a doubtful illness 22 days after the first injection and 18 days after the second injection. Case 4 developed dengue 11 days after the first injection and 7 days after the second injection, and Case 7 an attack of dengue 8 days after the first injection and 4 days after the second injection. Cases 2, 5 and 8 all remained negative. As detailed under the consideration of Cases 1 to 9 we attribute the infection of Case 7 to the first injection, and the infection of Case 4 to the second injection, namely, the material from Natural Case C. Cases 6 and 9 injected with the clear serum both developed dengue, the first eight days after the first injection and four days after the second, and Case 9 eleven days after the first injection and seven days after the second. Here again we attribute the infection of Case 6 to the first injection and Case 9 to the second injection.

Case D.—This patient was a soldier who was found suffering from an attack of dengue in camp at Sydney. He had been in camp in a dengue district (Brisbane) for some time. He had spent the previous Saturday, 15th April, 1916, at Sandgate, near Brisbane, where, he says, there were enormous numbers of mosquitoes. He remained well till the evening, when he felt "off colour." Next day he had pains in the back and across the loins and had a severe headache, especially behind the ears. He says he "saw double." There was eye pain on movement. There was no running at the nose; the throat was dry but not sore. He was ill on Monday, 17th April, 1916, and entrained for Sydney on Tuesday. In the train his temperature was 102 deg. During the train journey he first noticed a rash on the chest on the Wednesday morning. He vomited in the train very severely, the material being pale coloured. He arrived at Sydney on Wednesday night. He was admitted to hospital at 9.30 p.m. the same evening with a temperature of 99.8 deg. and a well-marked rash over the chest and back. Next day the temperature was 101 deg. On Friday, 21st April, 1916, the face was flushed and the eyes injected, and he looked ill though he said he was getting better. He still had pains in the back, &c., the eyes were injected and painful, and he was shivering. On inquiry, he stated that he had had dengue twice previously, but not during the present epidemic. On 21st April, 1916, blood was taken from this patient. It was kept on ice till 25th April, 1916. To portion a Wassermann test was applied with a negative result. The clot and serum was diluted with a normal saline solution and passed through a Pasteur-Chamberland filter. Before passing through the filter the material was inoculated with *B. prodigiosus*. Cultures made after filtration proved negative to ordinary bacteria. This material was injected on 28th April, 1916, into Case 18 with a negative result.

Case E.—J.B.C. (One of us). He reached the outskirts of the dengue area at Byron Bay at 7 a.m. on the 3rd April, 1916. At 10.30 a.m. he reached Murwillumbah, where the epidemic was still severe, though apparently on the decline. During the rest of this day and on the 4th and 5th April, he lived in an hotel in the centre of the dengue area, and saw a number of cases of the disease, and caught a number of mosquitos, both *Stegomyia fasciata* and *Culex fatigans*, in the surroundings of the patients. By means of mosquito netting and citronella oil and other devices, he protected himself as far as possible from being bitten by day-or-night-biting mosquitoes. On one or two occasions in patient's rooms *Stegomyia fasciata* mosquitoes settled on his arm or face, and began inserting their proboscides. These mosquitoes were immediately captured in test-tubes. As he is not particularly sensitive to mosquito bites, he may have been bitten unawares by other mosquitoes. Though he slept under mosquito curtains at night time, and though he did not find any mosquitoes in the net next morning, he cannot be certain that he was not bitten by such during the night. At about 5.30 on the afternoon of 5th April, he found that the unfed *Stegomyia* mosquitoes in his mosquito cage were escaping through the meshes of the wire, which were hardly close enough to prevent a slender mosquito from wriggling through. As the guinea-pig which had been taken up for the mosquitoes in the cages to feed upon was injuring the insects and tending to drive the thin ones through the wire meshing, he could not use this animal for distending the bellies of the mosquitoes, and consequently inserted his own hand and forearm to stop the exodus. The *Stegomyia* mosquitoes at once settled upon it, and eight or ten at least engorged themselves. These mosquitoes had been collected from houses in which cases of dengue had occurred, and in a number of instances actually from the rooms inhabited by dengue patients. At about 10 p.m. that same night in the dark he inserted his hand into the box containing *Culex fatigans*. He left it there motionless for about a quarter of an hour. He did not feel the bites of any mosquitoes, but is relatively insensitive to the bites of this insect, which may therefore have bitten him considerably. On 6th April, 1916, he descended the Tweed River to the Tweed Heads, where he saw further cases of dengue and caught more mosquitoes. He reached Brisbane that night, and thinks he may have been bitten by *Culex fatigans*, but cannot be certain. He left Brisbane at 8 o'clock on the 7th and with it the dengue area, arriving at Sydney at about 11 o'clock on the morning of the 8th with his two cages of mosquitoes.

Another of us (B.B.), who had not been to the dengue area at that time, placed his hand in the box containing *Stegomyia* mosquitoes, but for some reason these would not bite him. J.B.C. then inserted his hand, and a *Stegomyia* mosquito at once settled upon it and began to pierce the skin. The insect was shaken off and the hand withdrawn.

J.B.C. remained perfectly well until 12th April, 1916, and also on that morning when arising. Later in the morning he felt perhaps very slight and indefinite malaise. A similar condition existed after lunch, with a very slight tired feeling. At 5.15 p.m. the tired feeling was more definite, accompanied by the merest trace of headache and a feeling of discomfort in the eyeballs. The tired feeling resembled that of a cold, but with no coryza. His temperature at 6 p.m. was 99.2 deg., at 7.30 p.m. 100 deg., and at 9 p.m. 101.2 deg., with pulse 102 and respirations 18. He still only felt a tired feeling in the back and legs, with slight giddiness. He spent a very restless night—one of the most restless that he has ever experienced. He kept dropping off to sleep and sleeping for short intervals, and then would awaken suddenly with acute mental alertness. He was unable to get comfortable in any position, and had a slight headache and very slight sore throat, and he sneezed two or three times.

- 13th April, 1916.—At 6 a.m., temperature 98·4 deg. A very tired feeling, with indefinite pain in the back, legs, and eyeballs. 7·45 a.m., temperature 98·4 deg. Went into town at 8·15. At 11 a.m., temperature 100·2 deg. Returned home feeling indefinitely ill. At 2 p.m., temperature 100·8 deg. Slept fairly well in a deck chair from 2 till 4 p.m. At 6·30, temperature 101 deg., pulse 94; the eyes congested, headache slighter, and at 9 p.m. temperature 101·5 deg., pulse 92.
- 14th April, 1916.—Passed fairly good night. At 6·45 a.m., temperature 100·2 deg., slight subcuticular mottling of the abdomen. At 8 a.m., temperature 100 deg., pulse 84. At noon, temperature 100·2; at 6·15, temperature 100·5 deg., pulse 80; at 9·45, temperature 100 deg., pulse 76.
- 15th April, 1916.—Passed a good night. Temperature at 7 p.m., 98·8 deg.; at 3·30 p.m., 99·4 deg., pulse 80; feeling nearly well. Weeded a little in the garden, sitting down. At 6·45, temperature 99·6 deg., pulse 80. Feeling perhaps a trifle more tired than on the previous evening. A bitter taste in the mouth. At 10 p.m., temperature 99·2 deg.
- 16th April, 1916.—Passed a good night. At 7·30 a.m., temperature 98·6 deg., feeling stiff. At 2 p.m., temperature 99·2 deg. At 6 p.m., temperature 100 deg. At 10 p.m., temperature 99·8 deg.
- 17th April, 1916.—Temperature at 7 a.m., 99·4 deg.; 1·30 p.m., 100·4 deg.; 6 p.m., 100 deg.; 10 p.m., 100·8 deg.
- 18th April, 1916.—Temperature at 7 a.m., 99 deg.

Up to this time J.B.C. had not felt himself since his illness began, but he awakened however on the morning of 19th April, 1916, and experienced his usual feeling of health, which was quite different to the feeling on arising the day before, even though there was nothing tangible to be recognised beyond a very slight increase in temperature. Thereafter for several days he felt a certain amount of stiffness of the muscles and of aching during movements of the eyeballs. Also, during his convalescence, he took a dislike to tea and to smoking for a few days. These dislikes fortunately soon disappeared.

Blood was taken from this case on 14th April, 1916, and portion was injected into citrate normal saline solution, and part was allowed to clot in the serum abstracted. On the same day Case 10 was injected with the corpuscles from the citrated blood after thorough washing, and no illness resulted. Case 11 received an injection of the serum, and eight and a half days later developed a typical attack of dengue with a typical, almost morbilliform rash. Such a typical rash had been absent during the illness of Case E. Cases 14 and 15 received sub-injections from the successful Case 11 with material taken on the fourth day of the disease and received into citrate normal saline solution. One case received the washed corpuscles, and the other case the citrated plasma, but neither became ill.

APPENDIX II.

DETAILS OF FIRST SERIES OF MOSQUITO EXPERIMENTS.

(a). *Experiments with Stegomyia fasciata.*

At Murwillumbah on 3rd, 4th, and 5th April a number of *Stegomyia fasciata* were caught in the rooms of persons suffering from dengue or on the mosquito curtains of their beds, a few being also captured in houses where cases of dengue had recently occurred. These were supplemented by a few further mosquitoes caught on 6th April at Tweed Heads in the rooms of dengue patients. These mosquitoes were contained in a chocolate box with a wire gauze front and a sleeve of mosquito netting leading to an opening on one side. A small vessel with water was placed at the bottom of the cage. A guinea pig was taken with us for the purpose of allowing the mosquitoes to feed upon it, but owing to the smallness of the cage and the hairy coat of the animal, attempts to use it for feeding purposes were not successful and caused damage to a number of the mosquitoes, so it was dispensed with. The wire gauze was unfortunately not of a fine enough mesh to prevent a slender *Stegomyia* from occasionally wriggling through. As a number were escaping in this way, on 5th April at Murwillumbah, at about 5.30 p.m., one of us (J.B.C.) inserted his arm into the cage, when eight or ten out of about forty mosquitoes in the cage settled on his hand. These could be seen distending themselves with blood, and yet no sensation of pain or discomfort was at any time felt. On 6th April at Tweed Heads two dengue patients, one a sailor with a high temperature, and the other a Kanaka, placed their hands in the cage and several mosquitoes at least bit each individual. From Tweed Heads the mosquitoes were taken to Brisbane and thence to Sydney, which was reached on 8th April about 11 a.m. Thereafter the following persons were bitten by these mosquitoes in Sydney:—

8th April, 11 a.m.—One of us (B.B.) placed his hand in the cage; one or two mosquitoes apparently bit him, but for some reason they would not feed freely. The other of us (J.B.C.) was accidentally bitten by one mosquito at the same time. The assistant (W.T.), who accompanied one of us, was also bitten by one of the mosquitoes, but this was barely allowed to draw blood. J.G., Laboratory Assistant to one of us, who had volunteered for these experiments, was bitten by eight mosquitoes at 12·45 p.m. At 7 p.m. one of us (B.B.) was bitten by one of the mosquitoes.

9th April.—About twenty mosquitoes alive. B.B. bitten by one in the morning.

10th April.—Owing to the shaking of a motor bicycle a number of mosquitoes were on this day unfortunately injured, only three remaining alive. One of these bit B.B. in the morning. The volunteer J.G. could not induce any of the three to bite him at 5 p.m.

11th April.—J.G. bitten by two mosquitoes at 9.15 a.m.

12th April.—J.G. bitten by two mosquitoes at 9.15 a.m.

13th April.—Mosquitoes would not bite J.G. Two still alive.

Of the four persons bitten by this batch of mosquitoes, one (J.B.C.) developed a mild attack of dengue on the afternoon of 12th April. It seems probable that the disease was contracted by the mosquitoes which fed upon him at 5.30 p.m. on 5th April at Murwillumbah. B.B., W.T., and J.G. developed no symptoms indicative of dengue fever at this time.

(b) *Experiments with Culex fatigans.*

A number of *Culex fatigans* were collected at Murwillumbah on 3rd, 4th and 5th April, and at Tweed Heads on 6th April. They were all caught in rooms inhabited by dengue patients, either on the walls or on the mosquito netting. They were kept in a chocolate box with a gauze wire front, a small vessel of water being placed at the bottom during the night time in which the eggs could be laid. At 10 p.m. on 5th April at Murwillumbah, and on 6th April at Brisbane, one of us (J.B.C.) inserted his hand into the cage for about twenty minutes. On neither occasion were any bites felt, but the bite of this mosquito is often not felt by the individual attacked. The mosquitoes reached Sydney on 8th April. They were taken to the Coast Hospital, where a volunteer (McC.) placed his hand in the box in the dark at 7.30 p.m. Only about eight mosquitoes were alive in the cage and the volunteer thought that four of these bit him. At 9 p.m. one of our assistants (J.O.S.) put his hand into the cage and was, he thinks, bitten by two of the mosquitoes.

9th April.—McC. inserted his hand again at 7.30 p.m., but felt no definite bites though the mosquitoes settled on his hand. Several bit J.O.S. at 9 p.m.

11th April.—McC. at 7.30 p.m. placed his hand in the box. Apparently none of the mosquitoes bit. J.O.S. at 9 p.m. was bitten by one mosquito with certainty.

Thereafter neither of these individuals showed any signs indicative of dengue.

APPENDIX III.

Detailed Histories of the Four Successful Cases in which the virus of Dengue was conveyed by Stegomyia fasciata, in the Second Series of Mosquito Experiments.

Case 1.—J.G., æt, 18, male, laboratory assistant. Not previously in a dengue district. Subject of unsuccessful biting experiments (*Stegomyia*) on 8th April, 1916, 11th April, 1916, and 12th April, 1916.

11th May, 1916.—Bitten by some 28 *Stegomyia fasciata* at 2.15 p.m.

19th May, 1916.—Quite well in the morning. He felt a slight headache first in the afternoon. He came into town at about 7 p.m. to be bitten by mosquitoes, and while sitting with his hand in the cage noticed a feeling of heat and that his headache was worse. He went to lecture after this, and had to go out of the room and go home. He had no evening meal, and went to bed feeling shivery and hot at the same time, and spent a restless night. No vomiting occurred. Incubation period, 8 days 5 hours.

20th May, 1916.—He came into work. One of us (B.B.) saw that he was ill, and that he had a typical dengue face, swollen, hot, and purplish in colour. The headache was severe in the frontal region. His eyes felt as if they were "being pulled," and hurt somewhat to move. There was pain in the neck, and abdominal pains early in the morning. A weak feeling, as in influenza, but no definite pains were complained of elsewhere. There was no coryza, but the eyes were injected. Anorexia was marked, but no nausea complained of. The tongue was furred, creamy at the back, and the tip typically strawberry. There were three motions since rising. Temperature 101 deg. at 9 a.m.; 101.5 deg. at 11 a.m.; pulse-rate 105—see chart. We noted an indefinite subcuticular mottling. Blood was taken for injection experiments. The Wassermann test was negative. The patient was sent home too ill to work.

21st May, 1916.—Stopped at home.

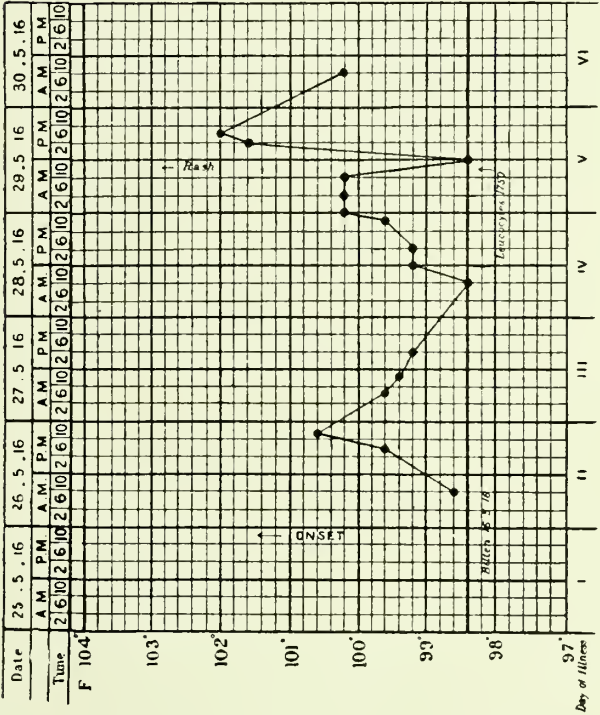
22nd May, 1916.—He came into town. There was doubtful mottling on the back and forearms. The tongue was still furred, with strawberry tip and edge. His legs were very painful. We took blood for injection experiment. The patient said that he felt "pretty well." Blood examination: Leucocytes, 6,400; polymorphonuclears, 78 per cent.; mononuclears, 22 per cent. (100 cells counted.) No parasites were found in the blood.

23rd May, 1916.—Temperature at 7 a.m. was 102.2 deg. He felt worse, the head and the eyes were bad. There was an indefinite mottled rash on the chest, arms and back, not very definite. Temperature at 4 p.m., 101.4 deg., pulse-rate 120. The face was flushed and he looked sick. No obvious coryza was noted.

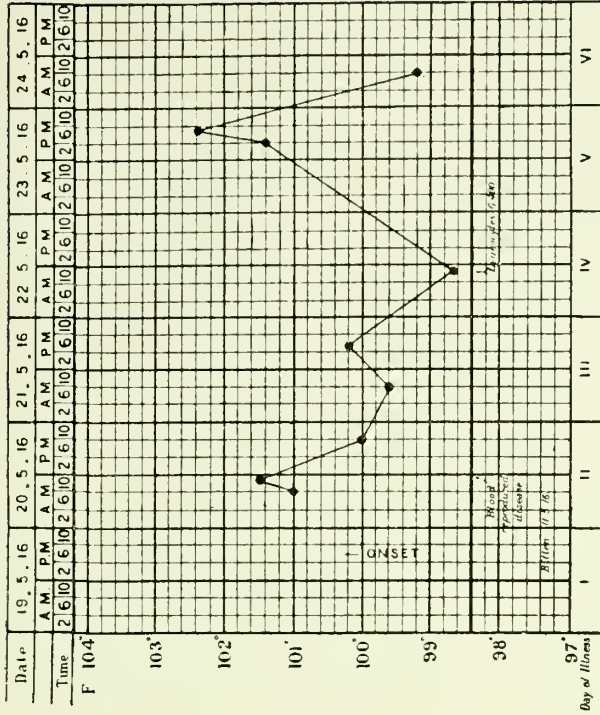
24th May, 1916.—The temperature at 7.30 a.m. was 99.2 deg. The head was not aching, and eyes were better. The back was stiff on waking and on bending. He felt fairly well. A definite, slight, mottled rash was seen on the back, lumbar region, and abdomen. It may be described as "midway between measles and scarlet fever, only much less marked."

After this the patient was well, and continued to work as usual.

One c.c.m. of the blood was taken from this patient on 20th May, 1916, and a volunteer (H.K., Case 27) was injected on 24th May, 1916, and became ill eight days later (1st June, 1916) mid-day, and had a typical attack of dengue, with a double temperature curve, typical symptoms and slow pulse.



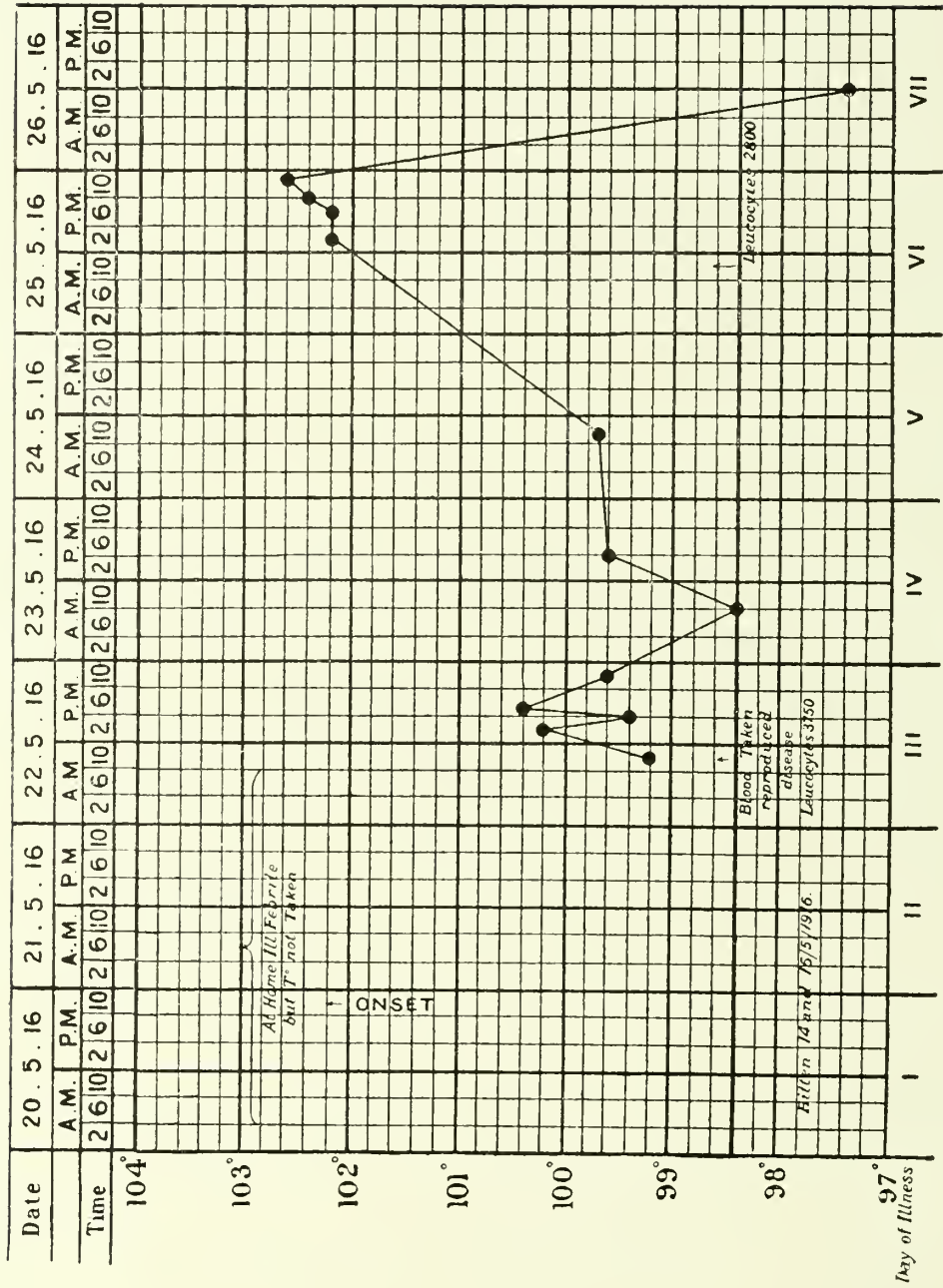
Case V, -M.



Case L-J G

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Case IV.—Wm.

One c.c.m. of the blood was also taken from this patient on 22nd May, 1916, and was injected into a volunteer (N. McA., Case 28) on 24th May, 1916, but no definite attack of dengue developed. This patient's temperature had a definite tendency to be above normal from the start, several times rising to just over 99 deg., and on 8th June, 1916, the afternoon temperature was 102 deg.; on 9th June, 1916, at noon, it was 100 deg., in the afternoon 102 deg.; on 10th June, 1916, at noon, it was 101 deg., in the afternoon it was 100·8 deg.; on 11th June, 1916, at noon, it was 99·2 deg., and in the afternoon 101 deg. After this the temperature, taken once daily, was normal. He did not complain of any symptoms. The second injection led, therefore, to a doubtful, but probably a negative result, as a definite febrile reaction that occurred did so 15 days after the inoculation, suggesting that it arose from some other cause.

Case IV.—Wm., æt. 27, male, laboratory assistant.

14th May, 1916.—Between 11·50 a.m. and 12·30 p.m. he was bitten by *Stegomyia fasciata*; 36 bites were counted.

15th May, 1916.—At 12·20 p.m. about 22 *Stegomyia* bit; at 4·30 p.m. about 14 *Stegomyia* bit.

Cold in the head during the last few days, but subsiding on 20th May, 1916.

20th May, 1916.—On going to bed he had headache, and passed a bad night. He had a sore throat. The temperature was not taken. The onset occurred at about 9 p.m. The shortest possible incubation period was 5 days 5 hours, and the longest possible incubation period was 6 days 9 hours.

21st May, 1916.—He said that his "eyes, ears and all joints and parts of body are painful." He stopped in bed all day. The headache was frontal, at the back of the head and "behind the eyes." His gums were tender. There was pain in the neck and spine; it was very bad in the lumbar region. "Every part of body was aching." Nausea was present, and he had no appetite; there was no diarrhœa; no delirium was noted; he was slightly constipated. He had no cough, but a sore throat. Some coryza was present. The temperature was not taken.

22nd May, 1916.—The patient got up at 8 a.m. Giddiness was present, and shivering. He vomited twice, and was much nauseated, and had no appetite. He came in to be examined. A definite rash, "midway between those of scarlet fever and measles," was found on the arms. It was doubtful on the back. This man said that his rash was often very definite on the arms on waking in the morning, but faded later. He looked ill, and showed a swollen, typical "dengue face." The tongue was furred in the centre and slightly strawberry at the tip. He was sent home too ill to work, and was very nauseated in the tram. The temperature on arrival at the laboratory was 99·6 deg., and the pulse-rate 82. The temperature later in the day was higher (see chart). Blood was taken from a vein for injection experiments. The Wassermann reaction was negative. Blood examination: Leucocytes, 3,700; polymorphonuclears, 53 per cent.; large mononuclears, 9 per cent.; lymphocytes, 30 per cent.; transitionals, 8 per cent. No parasites found. Red cells normal. (Amalgamated count by J.B.C. and B.B. Only 100 cells counted altogether.)

23rd May, 1916.—On rising, at about 9·30 a.m., the temperature was 98·4 deg. On arrival at the laboratory at 10·15 a.m. he complained of an oppressive feeling in the chest and headache. There was a rash on his back, subcuticular, measly, mottled, not well marked. It was still visible on the arms, especially on the underside of the forearms. At 4 p.m. he went home, as his back and head felt too bad to continue work, and he looked flushed and sick. His temperature was then 99·6 deg.

24th May, 1916.—He did not feel very well on rising, but was fairly well afterwards. His temperature, taken once only, was 99·7 deg., and his pulse-rate 96.

25th May, 1916.—In the morning he felt fairly well, but towards 2 p.m. felt much worse. The headache was severe and there was a tired aching in his limbs. The temperature was 102·2 deg. Blood examination: Leucocytes, 2,800; polymorphonuclears, 59 per cent.; lymphocytes, 30 per cent.; mononuclears, 7·5 per cent.; transitionals, 7·5 per cent.; eosinophiles, 1 per cent. (Two hundred cells counted.) Red cells normal. No parasites. The Widal reaction was negative. Rash.—This was definite, but slight, on the back, chest and abdomen, and on the anterior internal surface of the right upper arm over the biceps near the rolled up cuffs was a collection of slightly raised papules, which disappeared in a day or so. Elsewhere there was a faint measly rash.

26th May, 1916.—The temperature was subnormal. The man returned to his work nearly well. After this he regarded himself as well.

Blood from this case, taken on 22nd May, 1916, was injected into Volunteer P.S. (Case 29) on 24th May, 1916. The latter complained of drowsiness and aching eyes at 1 p.m. on 29th May, 1916, but his temperature was subnormal, and he was placed in bed at 6 p.m. on 30th May, 1916, when his temperature was found to be 101 deg. He went through a typical attack of dengue, with rash and slow pulse, but without the double temperature curve.

Case V.—M., 27, female, trained nurse. Previous history: She lived in the North Coast district about eight years ago. About eight or nine years ago she had two attacks of (?) dengue (a year or more apart). She spoke of the sudden onset and extreme pains, but says she did not notice a rash.

16th May, 1916.—She was bitten by 18 *Stegomyia* mosquitoes at noon.

25th May, 1916.—She was quite well all day, until about 10 p.m. While sitting sewing and listening to music, she suddenly felt sick and tired, with pains in her knees, and

and went to bed shivering, and did not sleep until 4 a.m. She said she did not feel as if feverish, and did not take her temperature. Incubation period: 9 days and 10 hours.

26th March, 1916.—She got up with a headache over the eyes and across the temples. The eyes were painful to move. The morning temperature was 98.6 deg. She worked all day, though not feeling well, having some nausea, but no vomiting. Occasional shivering occurred. The tongue was clean. Her eyes were slightly red and the conjunctivæ of the lids swollen; no coryza or cough was noted. She complained of slight sore throat. The fauces were slightly red, but nothing very definite was seen. Temperature: 6.15 p.m., 99.6 deg.; 9 p.m., 100.6 deg. She stated that she had no rash.

27th May, 1916.—The temperature at 7 a.m. was 99.6 deg.; at 11 a.m. it was 99.4 deg.; and at 4 p.m., 99.2 deg. The eyes were slightly jaundiced, and the ears slightly yellow, but she said the jaundice was more marked before she got ill on 25th May, 1916. The face was flushed, and she said her eyes were painful on movement, but the other symptoms were better. She had no pains in the neck, but had pains across the back and down the back of the legs, and occasionally a feeling of nausea. No rash was noted. She was not examined, except her arms, face, &c.

28th May, 1916.—She stopped in bed, as she usually did on Sunday morning, for rest. On examination (B.B.) the temperature was normal. The skin was mottled over the back, chest, and arms, not a definite rash, but abnormal. The elbows were red and pimply-looking, not very marked. She said she felt weak. Glands were found enlarged in the anterior triangle of the neck, on the left side; but these may have been present before. The temperature went up in the evening (see chart).

29th May, 1916.—At 9 a.m. she stated that she had had a very bad night, and could not rest at all. She had a recurrence of symptoms, and felt and looked sick. The headache was severe last night, and she took aspirin with relief. On rising, the matron described a well-marked, measly rash on her arms, which faded on exposure to cold. It was scarcely perceptible at 9 a.m. A mottled, indistinct rash was now on the back. The elbows showed a very marked and curious condition. The affected areas were about the size of a crown piece, red, raised, of a bright pink colour, and in the outlying parts were separate papules. She said they were painful to touch. This most distinct condition was seen by the matron and B.B. Blood examination: No parasites seen. Red cells normal. Leucocytes (duplicate counts made), 19 whole millimetre fields counted, 1,750. The morning temperature was 100.2 deg.: at noon it was normal, and it was up again at night to 102 deg. The tongue was furred in the centre, and strawberry-like at the tip.

30th May, 1916.—The patient said she had had a very bad night. Yesterday afternoon she got worse, felt very ill and could not rest at all at night. She could not lie in any position. She said never before had she felt so bad. On examination at 9 a.m., she looked ill; her face was flushed. The tongue was dirty, but not as much as yesterday. The temperature was 99.8 deg.

The rash was very marked on both arms. It was for the most part of a dark purplish pink colour, and measly in type. It was most marked on the external and extensor surfaces of the fore and upper arms to the shoulders. Over the elbows it was more raised and slightly papular. Very distinct discrete macules were fairly numerous on the palms of the hands. On the upper chest and on the upper back there was an indefinite mottling; on the lower back the mottling was more marked, but not as distinct as on previous occasions. On the knees there was a discrete, small papular rash over the anterior surface for about 6 to 8 inches. On the ankles there was a similar discrete, papular rash on the anterior surface, extending about 4 inches up the leg and slightly on to the dorsum of the foot.

She was seen by Drs. Paton, Armstrong, Van Someren, Woolnough, and by Dr. Bligh on the evening before, when the rash was distinct.

She stated to one of us later that, about this time, the rash was marked on the abdomen.

After 30th May, 1916, we did not see this patient, and she stopped taking her temperature, but she informs us that she was feeling sick at irregular intervals for a day or two, and suffered for about a week from marked pruritus, especially of the palms of the hands, severe enough to prevent her sleeping.

B.B. saw her next during his own illness, on Sunday, 4th June, 1916, when she was apparently quite well, but still complaining of the itching. Later she said she had occasional headaches for about a week after 30th May, 1916.

The drawing of the arm of this case was done by the Government Artist. We are of the opinion that the pale areas (unaffected skin) are somewhat too definite at the edges, but did not allow him to make any alteration, preferring his drawing to be an unprejudiced impression of a non-medical observer, an expert in matters of colour and form, but with no experience of or interest in whether or not the rash was that of dengue fever.

Case VI.—B.B., æt 34, male, medical practitioner.

13th May, 1916.—This was the last time B.B. was in the dengue natural area. He was bitten by mixed Grafton mosquitoes.

14th May, 1916.—He was bitten by mixed Grafton mosquitoes, and arrived back in Sydney (mid-day).

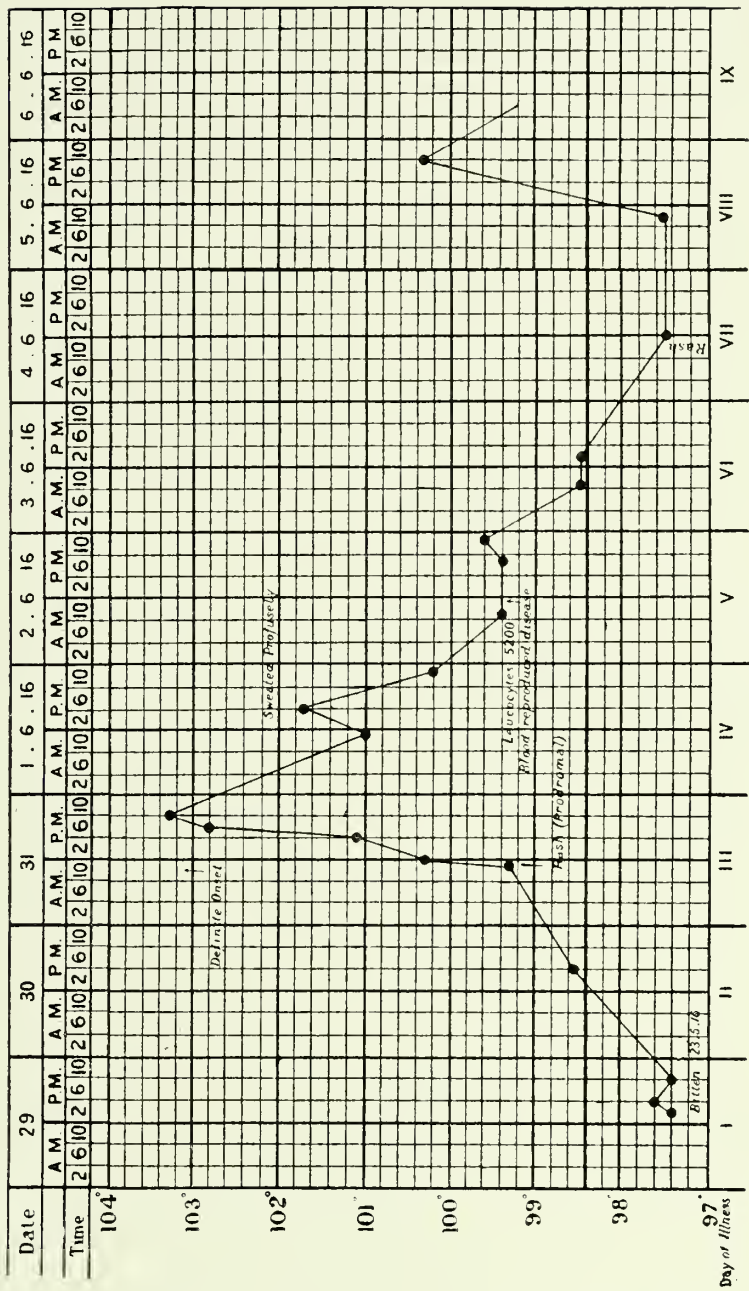
23rd May, 1916.—He was bitten with *Stegomyia fasciata* mosquitoes. Fifteen bites were counted. Time, early afternoon.

29th May, 1916.—He felt quite well on rising, but during the morning, while working, he had shooting pains in the head. In the middle of the day he had definite slight



CASE V.—Watercolour Drawing of Rash on Arm.

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slight headache and a slight "tired" feeling, and slight pains in the legs and arms. The temperature at 2 p.m. was 97.4 deg.; at 4 p.m., 97.6 deg.; and at 7 p.m., 97.4 deg. The symptoms were so slight that B.B. felt inclined to put them down to imagination, the wish to acquire dengue being father to the thought. He now regards these symptoms as prodromal, and thinks they might not have been noticed in a non-expectant individual.

30th May, 1916.—He was feeling "off colour," with occasional slight attacks of nausea, and had a tired sensation in the limbs and slight headache; he was worse towards evening, when he felt cold, shivery and tired, and went to bed early. He passed a rather disturbed night. The temperature at 4 p.m. was 98.4 deg.

31st May, 1916.—On rising, he had malaise, headache, nausea, shivering, pains all over (arms, legs, across shoulders, neck, spine, knees, ankles), and general headache. This increased during the day. The eyes were not very bad, but he was conscious of them feeling abnormal. He had slight sore throat and post-nasopharyngeal irritation, but no coryza. He felt unutterably weary, and could not concentrate his attention. The temperature at 11 a.m. was 99.3 deg.; at 1 p.m. it was 100.3 deg., and the pulse-rate was 80; at 3.45 p.m. the temperature was 101.1 deg., and the pulse-rate 96. A prodromal rash was present. The incubation period was about 7½ days to the onset of fever.

Description of prodromal rash seen by Dr. Chapple: "A rash resembling subcuticular petechial areas, varying in size; it is most marked on the abdomen, but also present on the back. It is most prevalent in the lumbar region posteriorly. The arms are not markedly affected. Each area shows no point of deepest intensity, and the edge is not sharply defined. The colour does not completely disappear on pressure. The colour might be described as a light raw ham colour, with a faint tinge of purple."

J.B.C.—Obscure mottling on the trunk; on the back the hair follicles prominent.

B.B. was seen by several medical men. All agree that a distinct rash was present.

Later in the afternoon he felt worse, but managed to work until 4.30, when he went home. He arrived home at 6 p.m. At 6.30 p.m. the temperature was 102.8 deg.; at 8 p.m. it was 103.3 deg., and the pulse-rate was 116.

Note at 8 p.m.—The patient was sitting by a gas fire; he felt very hot, but not very ill. Body pains, while resting, were not troublesome. He was very nauseated after tea, of which he ate moderately.

After going to bed, at 9 p.m., he had slight vomiting and marked nausea, and was very restless in bed, the pains in the ankles being maddening. He could only rest by protruding his feet outside the clothes, and could not bear the weight of the clothes. Once he got to sleep he slept well.

1st June, 1916.—The patient lay in bed all day. The headache was bad, and was accompanied by photophobia and eye pain. Shivering occurred at times, and giddiness on standing. He sweated twice profusely late in the day. There was slight mental wandering at night, but he slept fairly well.

2nd June, 1916.—He woke up with headache and eye pains still present, but feeling better, and went into town, though feeling rather shaky, very tired and depressed, nauseated and headachy. The temperature in the morning was 99 deg., leucocytes, 5,200. Blood drawn for injection experiments. He went to bed at 7.30 p.m.

A person (G.D., Case 26-32), inoculated with blood taken on 2nd June, 1916, developed typical mild dengue. Another person (E.H.R., Case 30), subject of a previous experimental attack, remained well (see injection results).

3rd June, 1916.—He did nothing all day. Headache was present, and his eyes were tender. He felt very depressed.

4th June, 1916.—The patient felt much the same as on the preceding day. The nausea was marked, especially after food. There was a well-marked rash all over the trunk. This rash was distinctly different in colour from the prodromal rash. The lesion might be described as an irregular, fairly bright mottling of the skin; irregular dark areas and irregular pale areas alternated. On the darker areas were brighter punctiform lesions. One of us (B.B.) likens the rash to the strawberry. The rash was best seen early in the morning, and was then noticed on the back of the wrists and on the flanks and back, being less marked on the abdomen. Later in the course of the illness it was well marked on the forearms. The elbows were somewhat red, but not distinctly so; the flexor and extensor surfaces were both involved; the rash was most apparent on the flexor surfaces of the forearms, and was slight on the external aspect of the buttocks and the anterior aspect of the knees, and doubtful on the ankles and palms. The rash was seen by Drs. Cleland, W. G. Armstrong, Paton, Woolnough, Isbister, Chapple and others, who all concur in its definite characters.

5th June, 1916.—He felt worse than on the previous day. He was intensely cold, and shivered immoderately. The rash was well-marked on the arms, wrists and trunk. The temperature was subnormal. Nausea and attacks of great giddiness occurred. In the evening, the temperature rose to 100.3 deg.

6th June, 1916.—He awakened feeling better, and apparently afebrile, and had a good breakfast. He then began work. The temperature at mid-day was 98.1 deg. The rash was still well marked; it was seen by Drs. Cleland, Paton, and Armstrong.

7th June, 1916.—He still had headache and slight tenderness on moving his eyes. There was still some nausea and tiredness. The temperature at 11 a.m. was 97.6 deg.

For the rest of the week he was not feeling "himself," although afebrile. There was a tendency to have headache during part of the day, and pain on moving the eyes and stiffness in the joints, back, &c. A bad taste in the mouth was noted, and inability to enjoy smoking. There was also noted some itchiness of the skin and palms of the hands.

13th May, 1916.—Blood was drawn for injection experiments.

27th May, 1916.—The skin was peeling on the legs and hands. The patient had symmetrical, bright-coloured patches of rash on the hips and across the back, which were first noticed about a week before. There were irregular bright red areas alternating with pale skin. The skin was very irritable all over. He still had a stiff, painful feeling on rising in the morning. Otherwise he felt quite well.

The patches of rash on the hips gradually faded, leaving some staining.

Injection Experiments.—G.D. (Case 26-32) swallowed blood from a previous (blood inoculation) case on 24th May, 1916, and complained of pains in the head and dizziness from 28th May, 1916, (four days later) to 31st May, 1916, but had no rise of temperature, the temperature being taken once daily. On 2nd June, 1916, he was given 1 c.c. of blood from B.B. subcutaneously. He became ill on 11th June, 1916. (8½ days later), and his temperature rose on 12th June, 1916, in the evening. He had a definite attack of dengue, with a single temperature curve.

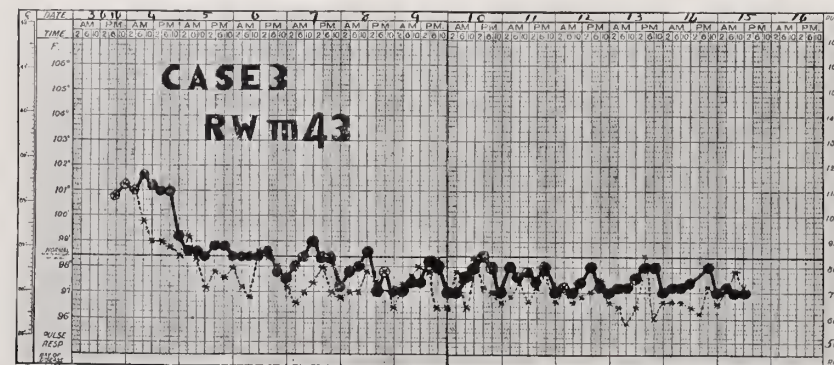
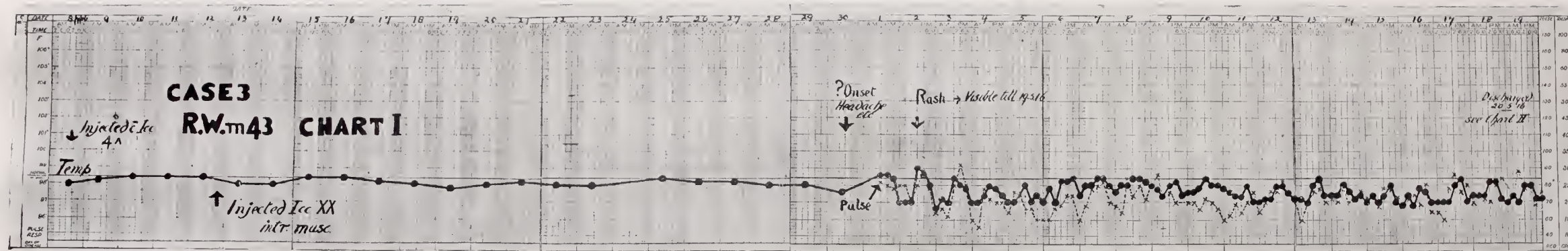
Another experiment was made with the same specimen of blood; 1 c.c. was injected into a volunteer (E.H.R., Case 30), who had passed through a typical attack of experimental dengue, commencing on 25th May, 1916, and terminating on 30th May 1916. (Case 13.) No symptoms followed this second injection within a period of fourteen days.

With a specimen of blood taken on 13th June, 1916 (14 days from the onset of B.B.'s illness), a volunteer (G.R., Case 31) was injected with 8 minims. No symptoms or signs of dengue followed during the subsequent nine days.

APPENDIX IV.

Tabulated Statement of the Details of the Inoculations and Allied Experiments.

No.	Initials and age.	Material used for experiment.		Day of illness on which material was taken.		Date of collection of material.		Date of injection.		Period material was outside body.		Result.	Bordet (Wassermann).	Incubation period.
		Injection.		Injection.				Injection.		Injection.				
		1st.	2nd.	1st.	2nd.	1st.	2nd.	1st.	2nd.	1st.	2nd.			
1	J.H., 40 ...	4A .....	.....	3rd ..	...	5-4-16		8-4-16	.....	3 days	.....	Neg. ...	.....
2	G.C., 43 ...	4A	XX	3rd ..	8th ..	5-4-16		8-4-16	12-4-16	3 „ ...	$\frac{1}{2}$ day ..	Neg. ...	.....
						12-4-16								
3	R.W., 43 ..	4A	XX	3rd ..	8th ..	5-4-16		8-4-16	12-4-16	3 „ ...	$\frac{1}{2}$ „ ...	.....	.....	30-4-16, 22 or 18 days.
						12-4-16								
4	M.J.W., 46	4A	XX	3rd ..	8th ..	5-4-16		8-4-16	12-4-16	3 „ ...	$\frac{1}{2}$ „ ...	Pos. ...	.....	19-4-16, 11 or 7 days.
						12-4-16								
5	J.B., 48 ...	4A	XX	3rd ..	8th ..	5-4-16		8-4-16	12-4-16	3 „ ...	$\frac{1}{2}$ „ ...	Neg. ...	.....
						12-4-16								
6	W.McG. 48	1C	X2	3rd ..	8th ..	4-4-16		8-4-16	12-4-16	4 „ ...	$\frac{1}{2}$ „ ...	Pos. ...	Neg. ...	16-4-16, 8 or 4 days.
						12-4-16								
7	J.C., 49 ...	1C	XX	3rd ..	8th ..	4-4-16		8-4-16	12-4-16	4 „ ...	$\frac{1}{2}$ „ ...	Pos. ...	Pos. ...	16-4-16, 8 or 4 days.
						12-4-16								
8	J.McA. 53	1B	XX	3rd ..	8th ..	4-4-16		8-4-16	12-4-16	4 „ ...	$\frac{1}{2}$ „ ...	Neg. ...	.....
						10-4-16								
9	Ed. 56 ...	1B	X2	3rd ..	8th ..	4-4-16		8-4-16	12-4-16	4 „ ...	$\frac{1}{2}$ „ ...	Pos. ...	.....	19-4-16, 11 or 7 days.
						10-4-16								
10	J.D., 64 ...	YA corpuscles from Case E.		3rd .....	.....	14-4-16		14-4-16		Less than 12 hours.		Neg. ...	.....
11	E.C., 51 ...	YB serum from Case		3rd .....	.....	14-4-16		14-4-16		Less than 12 hours.		Pos. ...	Neg. ...	23-4-16, 8 $\frac{1}{2}$ days.
12	G.J., 47 ...	Filtered blood from Case 6.		2nd .....	.....	17-4-16		18-4-16		1 day		Pos. ...	Neg. ...	25-4-16, 6 $\frac{1}{2}$ days.
13	E.H., 44...	Blood, Case 6.....		2nd .....	.....	17-4-16		18-4-16		1 „		Pos. ...	Neg. ...	25-4-16, 6 $\frac{1}{2}$ days.
14	T.H., 59 ...	Corpuscles, Case 11 ..		4th .....	.....	26-4-16		27-4-16		1 „		Neg. ...	.....
15	E.C., 45 ...	Washings, Case 11 ...		4th .....	.....	26-4-16		27-4-16		1 „		Neg. ...	.....
16	G.R., 55 ...	Corpuscles, Case 13 ...		2nd .....	.....	26-4-16		27-4-16		1 „		Pos. ...	Neg. ...	3-5-16, 6 days.
17	W.W., 38	Washings, Case 13 ...		2nd .....	.....	26-4-16		27-4-16		1 „		Pos. ...	Neg. ...	(?) 3-5-16, 6-7 days.
18	J.T., 64 ...	Filtered blood from Case D.		6th .....	.....	21-4-16		28-4-16		7 days		Neg. ...	.....
19	McS., 65	Filtrate from Case 11		4th .....	.....	26-4-16		28-4-16		2 „		Neg. ...	.....
20	J.P., 56 ...	Filtrate from Case 12		2nd .....	.....	26-4-16		4-5-16		8 „		Neg. ...	.....
21	W.F., 63...	Filtrate from Case 13		2nd .....	.....	26-4-16		4-5-16		8 „		Neg. (?)	.....
22	A.C., 19 ...	Vaccinated with serum 16, 17.		3rd .....	.....	5-5-16		6-5-16		1 day		Pos. (?)	Neg. ...	
23	R.K., 48 ..	Nostrils swabbed with serum 16, 17.		3rd .....	.....	5-5-16		6-5-16		1 „		Neg. (?)	Neg. ...	
24	W.C., 30 ..	Swallowed serum 16, 17.		3rd .....	.....	5-5-16		6-5-16		1 „		Pos. (?)	.....
25	L.J., 52	Serum from No. 17...		3rd .....	.....	5-5-16		12-5-16		7 days		Pos. ...	Neg. ...	21-5-16, 9 days.
26	G.D., 67 ...	Swallowed serum from 25.		4th .....	.....	24-5-16		24-5-16		4 „		Neg. (?)	.....
27	H.K., 50...	Blood from J.G., No. 1.		2nd .....	.....	20-5-16		24-5-16		4 „		Pos. ...	.....	1-6-16, 8 days.
28	N.M., 63 ..	Blood from J.G., No. 2.		4th .....	.....	22-5-16		24-5-16		2 „		Neg. (?)	.....
29	P.S., 46 ...	Blood from Wm.....		3rd .....	.....	22-5-16		24-5-16		2 „		Pos. ...	.....	(?) 30-5-16,
30	E.H., 44 ...	Blood from B.B., No. 1.		3rd .....	.....	2-6-16		2-6-16		3 hours		Neg. ...	.....	30-5-6 days.
31	G.R., 49 ...	Blood from B.B., No. 2.		14th.....	.....	13-6-16		13-6-16		3 „		Neg. ...	.....
32	G.D., 67 ...	Blood from B.B., No. 1.		3rd .....	.....	2-6-16		2-6-16		3 „		Pos. ...	.....	11-6-16, 8 $\frac{1}{2}$ days.



APPENDIX V.

HISTORIES OF CASES IN WHICH MATERIAL FROM CASES OF DENGUE WAS INJECTED, &c.

Subcutaneous Injection of Filtrate of Citrated Blood, taken on the third day of the Natural Disease (Case A), outside the body three days. Result negative.

Case 1.—J.H., m., 48, was injected subcutaneously on 8th April, 1916, at 3 p.m. with 1 c.c. of filtrate 4A (Pasteur-Chamberland filtrate of citrated blood of Natural Case A, taken on the third day of the disease on 5th April, 1916). The patient remained well, being under observation for at least twelve days. The result was negative.

Same injection as Case 1, followed four days later by a Subcutaneous Injection of whole Citrated Blood, taken on the eighth day of the Natural Disease (Case C). Outside the body half day. Result negative.

Case 2.—G.C., m., 43, was injected subcutaneously on 8th April, 1916, at 3 p.m. with 1 c.c. of filtrate 4A (see above), and on 12th April, 1916, was again injected subcutaneously at 7.30 p.m. with 1 c.c. XX (whole citrated blood from Natural Case C, taken on the eighth day of the disease, 12th April, 1916.) This case remained well, being under observation at least eighteen days.

The same injections as Case 2, save that the second one was Intramuscular. Result : An illness of a doubtful nature, beginning twenty two days after the first injection and eighteen days after the second.

Case 3.—R.W., m., 43, was injected subcutaneously with 1 c.c. of filtrate 4A (see Case 1), on 8th April, 1916, at 3 p.m., and with 1 c.c. XX intramuscularly on 12th April, 1916, at 7.30 p.m. He became suddenly ill eighteen days later on 30th April, 1916, about mid-day, complaining of headache, aching eyes, and a feeling of drowsiness. He was placed in hospital, and on examination on 1st May, 1916, showed a flushed face with injected eyes, a furred tongue, and an injected pharynx, presenting an appearance suggestive of a mild attack of dengue. His skin was hot and a faint rash seemed beginning to appear on the back. The back showed an erythematous condition, and was very sensitive to pressure. This flushed condition of the back was constant. When questioned regarding any running from the nose, he stated he was suffering in that way, but it was not apparent at this or at subsequent daily examinations. The morning temperature was 98.6 deg., and the evening one 98.4 deg.

2nd May, 1916.—The headache was still present, and the eyes aching and heavy. There was a pink mottling confined to the back with the congested condition of the back still present. Temperature, morning, subnormal; midday, 99 deg.; evening, subnormal.

3rd May, 1916.—No symptoms. The rash extended round the flanks, but was not seen in any other area. Temperature, subnormal.

4th May, 1916.—No symptoms. The rash was fainter, but could be demonstrated on the back and less distinctly on the abdomen. Temperature, subnormal.

6th May, 1916.—No symptoms. The rash was faintly distinguishable on the back. Temperature, subnormal.

7th May, 1916.—No symptoms. Still a faint pink mottling on the back. Tongue still coated. Temperature, subnormal.

8th May, 1916.—No symptoms. The rash seemed to be more demonstrable and to be present on the back, abdomen and lower part of the chest. Urine, 1015; acid, no albumen or sugar. Temperature, normal.

9th May, 1916.—No symptoms. The rash has the same distribution as on the previous day. Temperature subnormal.

10th May, 1916.—No symptoms. The rash has the same distribution as on the previous day. Temperature subnormal.

12th May, 1916.—No symptoms. The patient was allowed up, the pink mottling of the back being still present.

(During the period 2nd May, 1916, to 12th May, 1916, he sweated very freely at night.—Nurse's report.)

19th May, 1916.—Re-examined. No obvious rash. Feels well, but complains of weakness. Temperature, subnormal.

20th May, 1916.—Discharged from hospital. Temperature, subnormal.

2nd June, 1916.—He became ill again with "headache and aches all over."

3rd June, 1916.—He was sent into hospital. Evening temperature, 101 deg.

4th June, 1916.—On examination his face was found to be flushed; the eyes were injected and watery; there was no running from the nose; the tongue was thickly coated; there was a definite congested condition of the back, but no rash. He states he feels very ill, with a terrible headache. Temperature, morning, 101.6 deg.; evening, 101 deg.

5th June, 1916.—Headache still bad; tongue coated; no rash. Temperature, morning, 98.6 deg.; evening, 98.8 deg.

6th June, 1916.—Seems well, but still complains of headache; eyes not watery; tongue clean. Temperature, morning, 98.4 deg.; evening, 98.6 deg.

7th June, 1916.—Complained of profuse sweating at night since admission; slight headache and occasional cough; tongue cleaning. Temperature, morning, normal; noon, 99 deg.; evening, 98.4 deg.

- 8th June, 1916.—Pains in the back (lumbar region); no rash; no sweating. Temperature after this date normal or subnormal.
 9th June, 1916.—Had a good night; feels well; no rash.
 10th June, 1916.—Feels well. Urine, 1030, acid, no albumen, reduction of Fehling's solution.
 11th June, 1916.—Still feeling well. Urine, 1026, no albumen, acid, reduction of Fehling's solution.
 12th June, 1916.—Well. Urine, 1006, acid, no albumen, no reduction of Fehling's solution.
 15th June, 1916.—Well. Discharged.

Although the symptoms were suggestive and some rash present, the length of the incubation period and absence of fever in the first attack make it seem probable that this case was not one of dengue. In any case, it is impossible to include it in our positive results.

The same injections as Case 3. Result: Positive, not marked. Incubation period: Seven days from second injection, or eleven days from first injection.

Case 4.—M.J.W., m., 46, was injected subcutaneously with 1 c.c. 4A (see above) on 8th April, 1916, at 3 p.m., and on 12th April, 1916, at 7.30 p.m., intramuscularly with 1 c.c. of XX (see above).

He stated he had never felt perfectly well since the second injection, but became definitely sick on the night of 19th April, 1916, with "a feverish feeling and darting pains like rheumatism in all his joints, particularly the knees and shoulders." He also had occipital headache.

- 20th April, 1916.—On examination there was found to be flushing of the face; slight injection of the eyes; no coryza; a coated moist tongue; no rash, but an erythematous condition of the back. He complained of pains all over the body, particularly in the joints. Temperature, morning, 101 deg.; evening, 99.8 deg.
 21st April, 1916.—Feels well; no rash. Temperature, morning, normal; noon, 99.8 deg.; evening, 99.8 deg.
 22nd April, 1916.—Feels well; no rash. Temperature, morning, 99.4 deg.; evening, 99.4 deg. (Drop to 97.4 deg. at 4 p.m.)
 23rd April, 1916.—The face seems more flushed. Complains of headache, and pains in the right shoulder. Temperature, morning, subnormal; afternoon, 99.8 deg.
 24th April, 1916.—Pains in the legs and shoulders, with headache. Temperature, morning, 99.8 deg.; evening, 100 deg.
 25th April, 1916.—Slight headache with pains in the muscles of the lower half of the body; tongue still coated and moist. Temperature, morning, subnormal; evening, 100.2 deg.
 26th April, 1916.—"Rheumatic pains in the knees and hips, and in the muscles from the hips down"; complains of sleeping badly. No rash. Temperature, morning, subnormal; evening, 99.6 deg.
 27th April, 1916.—Occasional pains in the knees and shoulder joint; no rash. Temperature, morning, subnormal; evening, 99 deg.
 28th April, 1916.—Still pains in the knees; feels well. Urine clear, 1018, acid, no albumen or sugar. Temperature, morning, subnormal; evening, 99 deg.
 29th April, 1916.—Pains in the elbows and shoulders. Temperature, morning, subnormal; evening, 99 deg.
 30th April, 1916.—Pains in the knees; headache. Temperature, morning, subnormal; evening, 99 deg.
 1st May, 1916.—Pains in the knees and hips. Temperature, morning, subnormal; evening, 99 deg.
 2nd May, 1916 to 5th May, 1916.—Pains in the knees and hips. Temperature, morning, subnormal; evening temperature on 2nd May, 1916, 99 deg. After this not above normal.
 6th May, 1916 to 12th May, 1916.—Feels well. Temperature subnormal. Discharged on latter date.
 Urine (undated), 1020, acid, no albumen or sugar.

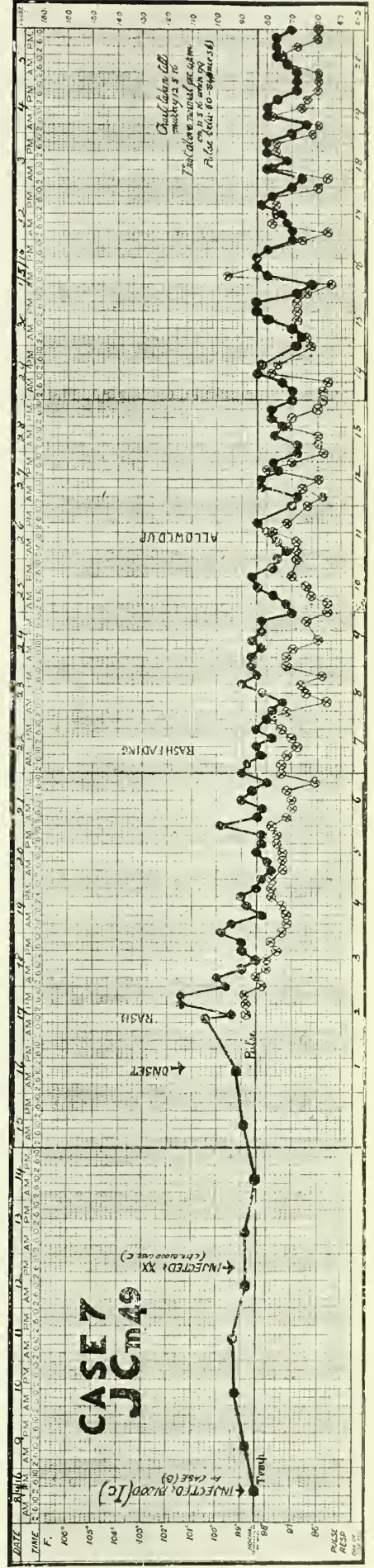
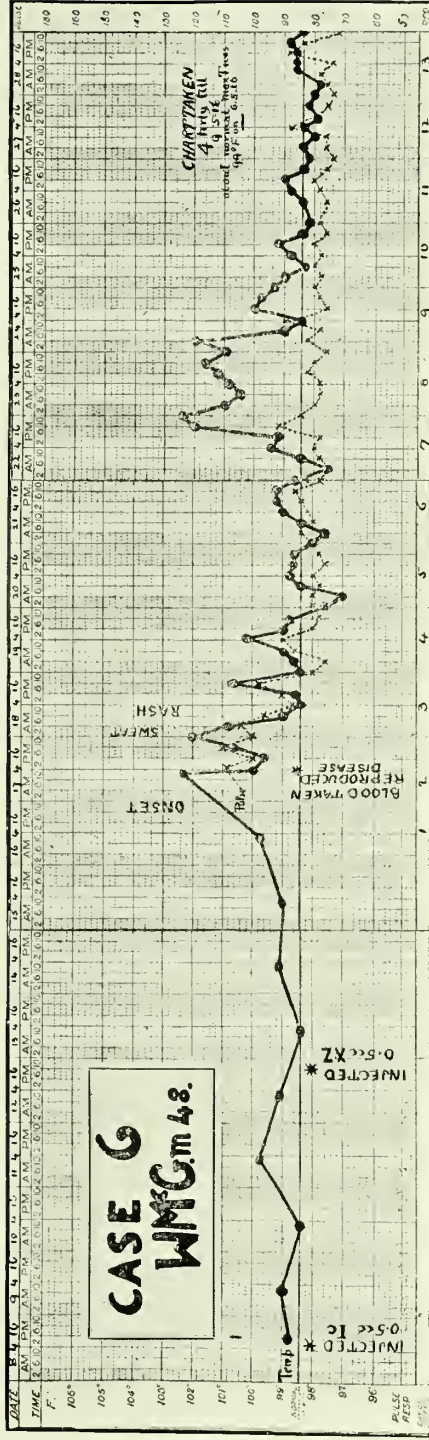
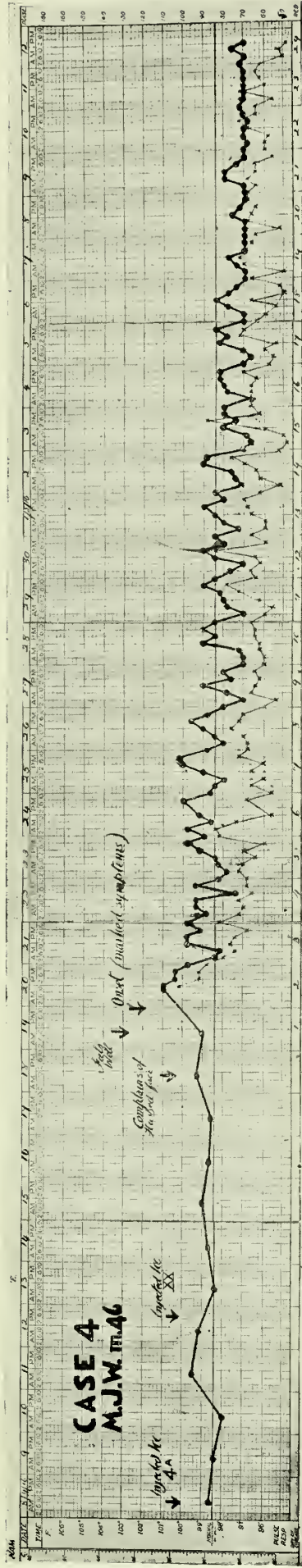
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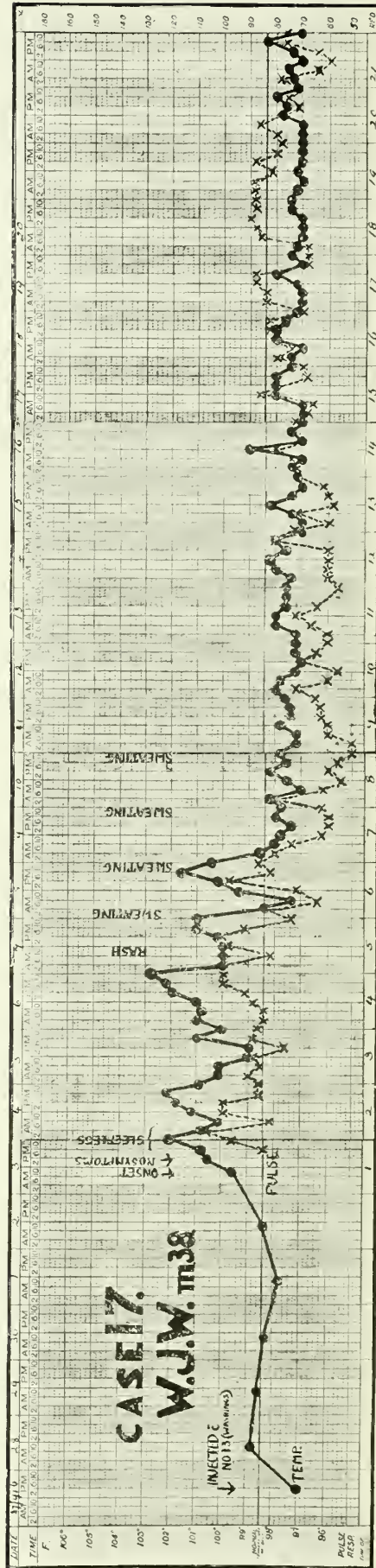
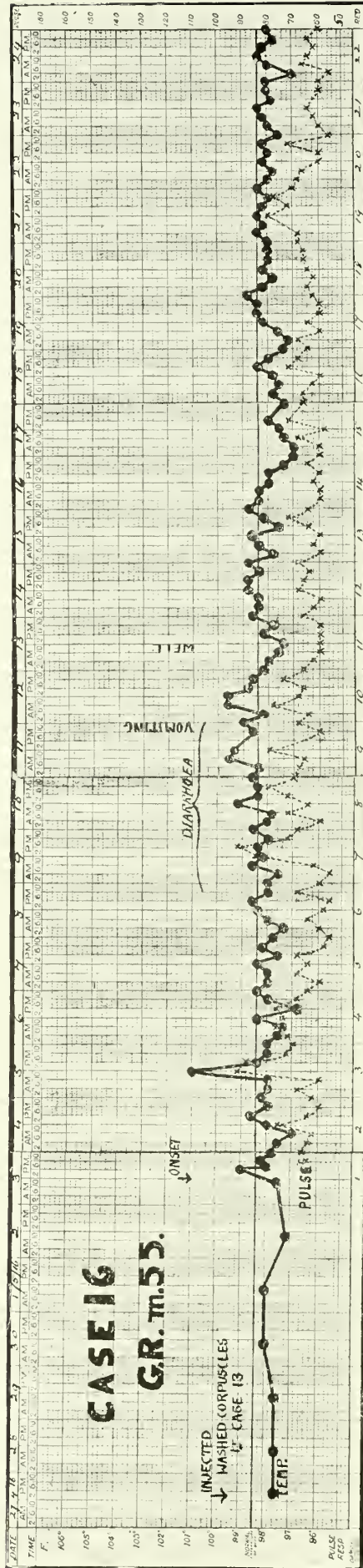
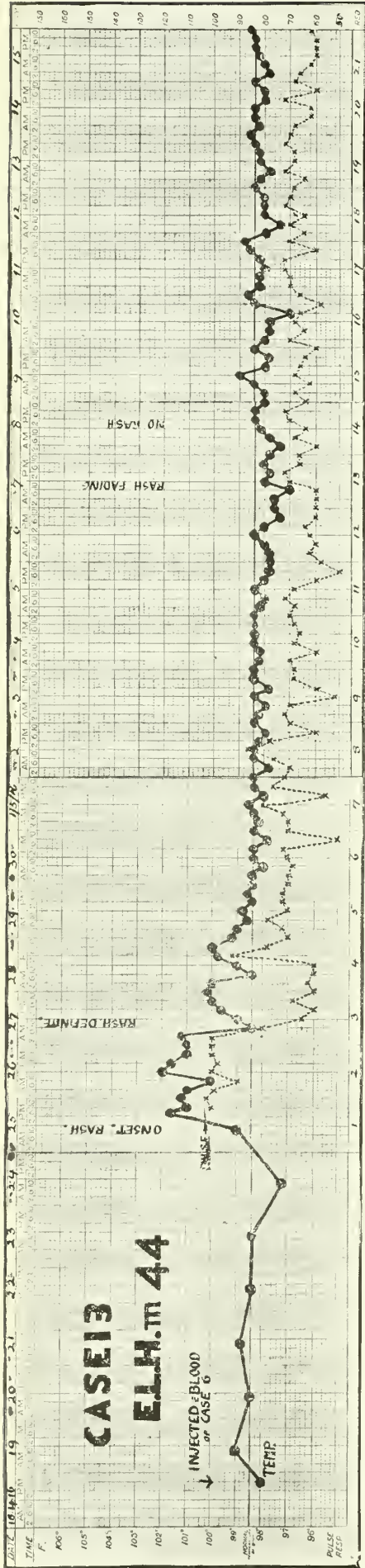
A review of the chart shows some approximation to the double type. This is undoubtedly an irregular diphasic variation, with the high points at noon on 20th April and 8 p.m. on 25th April. There are, however, several intermissions. Relative bradycardia is very marked after the first day, and periods of absolute bradycardia are frequent. The temperature took a considerable period to settle down, as seen by reference to the chart.

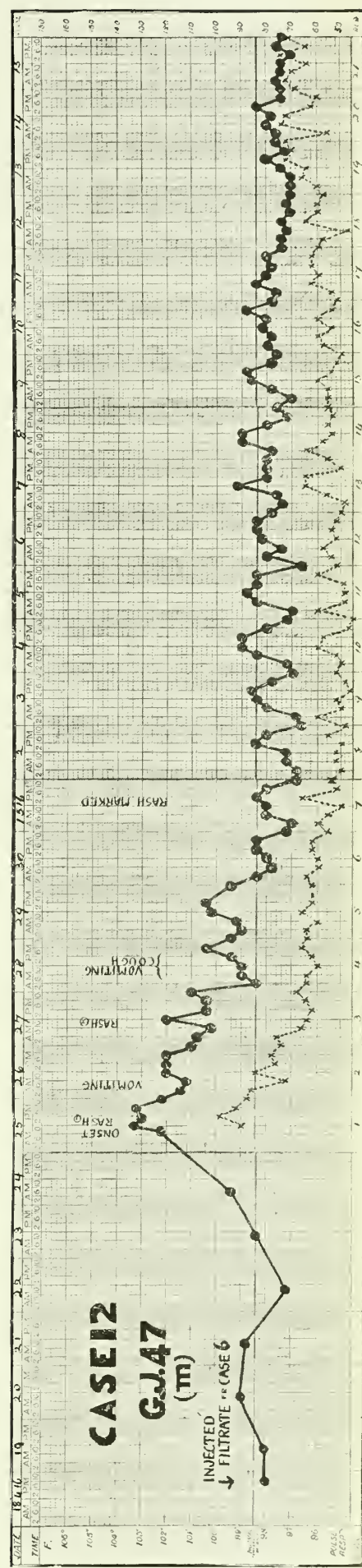
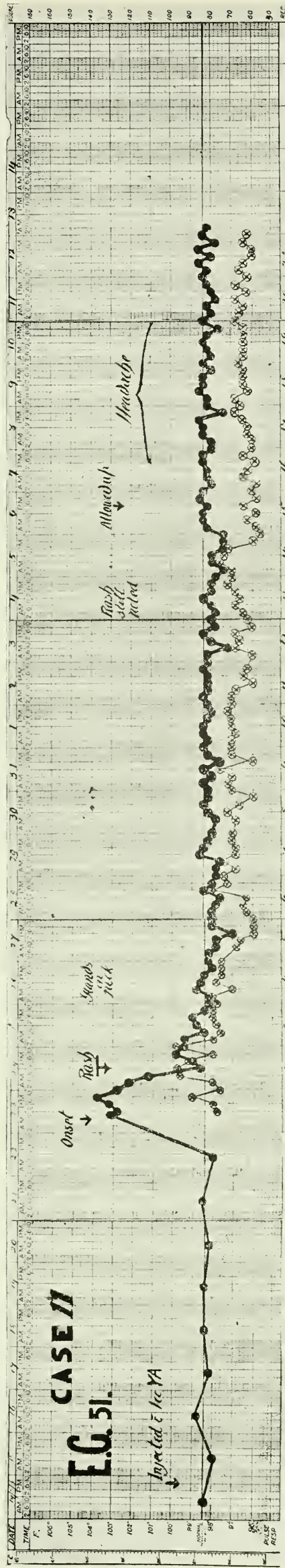
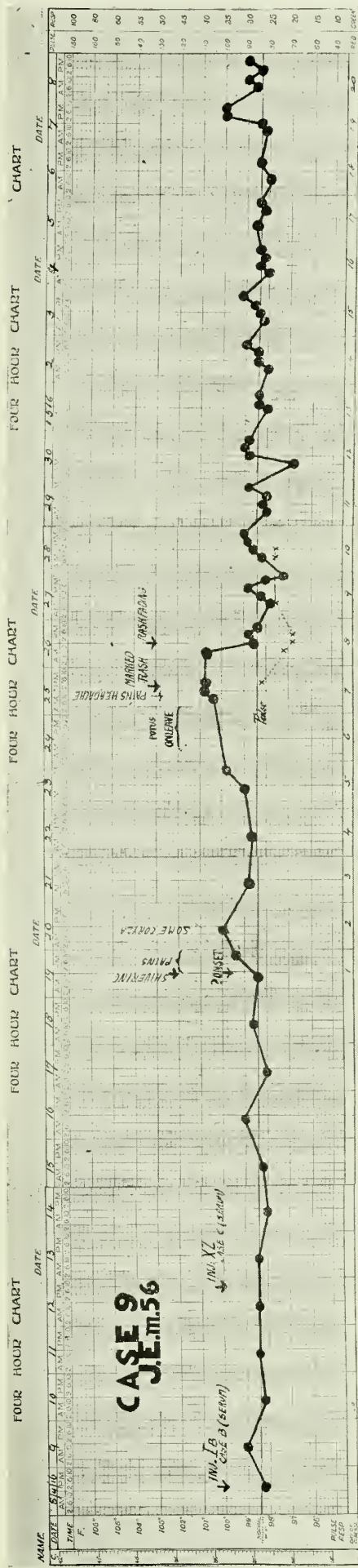
This was the only case in which the patient described the pains as being "rheumatic." There was no tenderness in or around any of the joints of which complaint was made, so that acute rheumatism could be excluded.

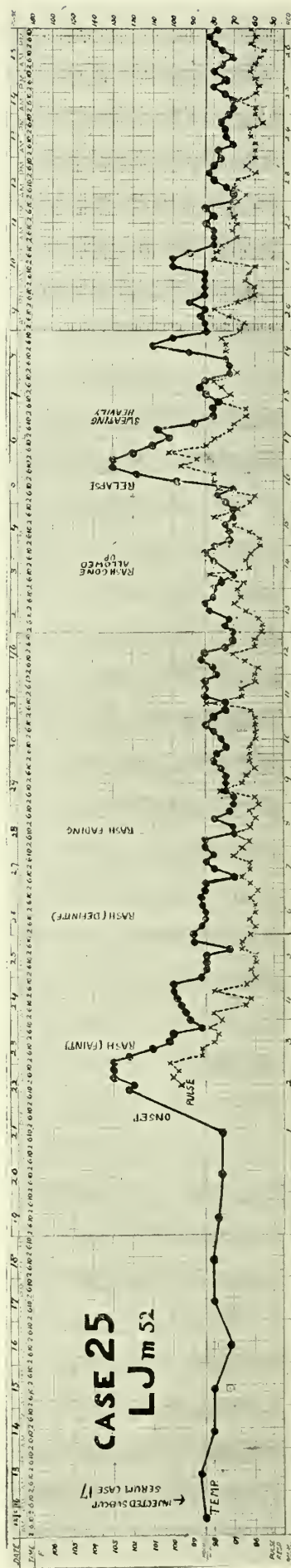
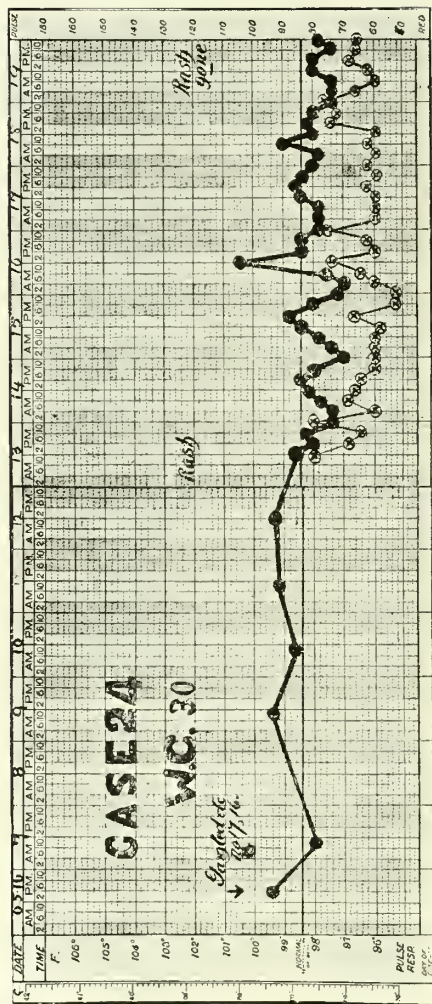
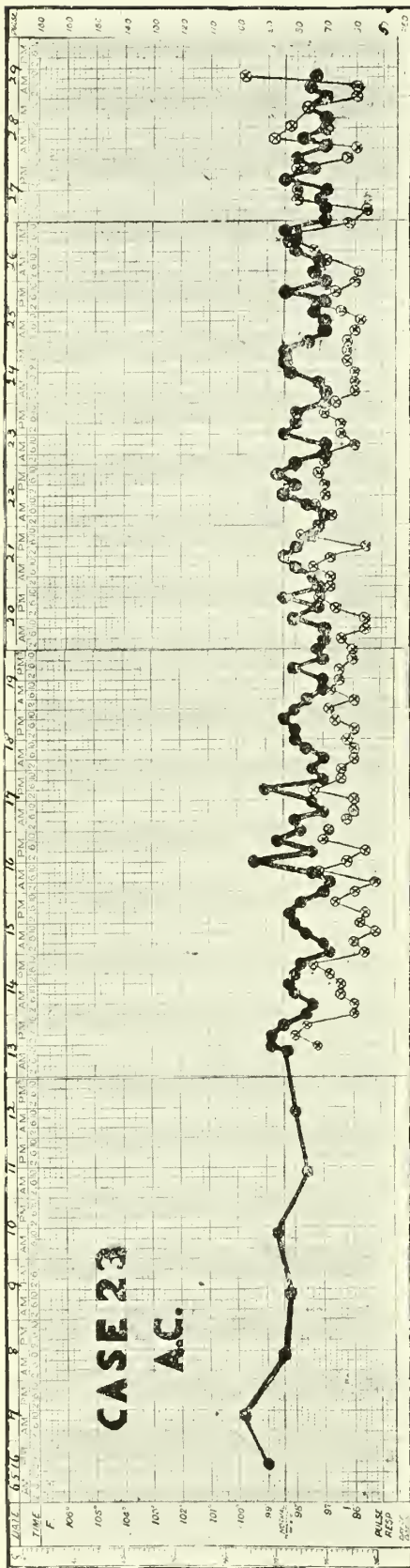
The case is considered a positive one with the invasion on the night of 19th April, 1916, thus giving an incubation period of seven days from the second injection, or eleven days from the first injection. The case was under observation for thirty-five days from the first injection.

Same Injections as Case 3. Result: Negative.









Case 5.—J.B., m., 48, was injected *subcutaneously* on 8th April, 1916, with 1 c.c. of 4A (see above), and *intramuscularly* on 12th April, 1916, with 1 c.c. of XX (see above). This case remained well, being under observation at least twelve days.

The result was negative.

Subcutaneous Injection of Serum and Corpuscles, taken on the third day of the Natural Disease (Case B), outside the body four days, followed four days later by a Subcutaneous Injection of Serum, taken on the eighth day of the Natural Disease (Case C), outside body half day.

Result—Positive. Incubation Period—Eight days from the first injection, or four days from the second injection.

Case 6.—Wm. McG., m., 48, was injected with 0.5 c.c. of IC. (serum and corpuscles from Case B) on 8th April, 1916 at 3 p.m., and with 0.5 c.c. of XZ (serum from Case C) at 7.30 p.m. on 12th April, 1916. He became suddenly ill on the night of 16th April, 1916, with frontal headache, a "feeling of cold and hot all over," and a dead aching pain in the legs and lumbar region and an acute sharp pain in the back of the neck.

17th April, 1916.—On examination, face flushed, particularly the forehead; eyes slightly injected; injection of pharynx; tongue coated and moist. Appetite good; no rash; sweated freely during the night; slept well; temperature at 10.30 a.m., 102.3 deg.; noon, 100 deg.; midnight, 102 deg.

The Pasteur-Chamberland filtrate of clot and serum, and the untreated serum and corpuscles obtained from the blood of this case on this date, conveyed the disease to Cases 12 and 13 respectively, after an incubation period in each case of 6½ days.

18th April, 1916.—Slight headache; pains nearly gone; feels fairly well; skin active; pains in the muscles of the arms. *Rash*.—A scarlet flush in the axillary line round the waist and on the buttocks (pressure?). Temperature, 8 a.m., 99 deg.; noon, normal; 8 p.m., 100.6 deg.

19th April, 1916.—Face less flushed; tongue cleaning; feeling fairly well; a faint blotchy erythematous rash on the back and shoulders. Temperature, 8 a.m., 98.6 deg.; noon, 100.2 deg.

20th and 21st April, 1916.—Feels well; rash the same; highest temperature 99.4 deg.

22nd April, 1916.—Feels well. In the evening of this day (midnight), the temperature rose to 102.6 deg.

23rd April, 1916.—Feels well; temperature, 8 a.m., 100.6 deg.; 8 p.m., 102.2 deg.

24th April, 1916.—Eyes aching; otherwise well; temperature, 8 a.m., 99 deg.; 8 p.m., 99.8 deg.

25th-27th April, 1916.—Feels well; rash the same. The highest temperature was 99.4 deg.

28th April, 1916.—Feels well; rash the same; allowed up; urine clear, 1025, acid, no albumen or sugar. Temperature normal.

3rd May, 1916.—Feels fairly well.

4th-10th May, 1916.—Quite well but "weak in the legs."

The urine tested on two other occasions showed:—

A. 1010, acid, no albumen or sugar.

B. 1030, acid, no albumen or sugar.

Remarks.

The incubation period was approximately eight days from the first injection, or approximately four days from the second injection.

The duration of illness was about twelve days. The patient was under observation thirty-two days.

The chart shows definitely a double stage of pyrexia, and is the most typical saddle-back chart in our series of injection cases. In this connection one cannot overlook the double injection and the possibility of the double temperature phase being related to this, but consideration of several other cases, notably case 25, following a single injection, and consideration of certain of the mosquito cases, does not lend support to such a hypothesis. The saddle-back temperature in this case is a classical feature seen in a moderate number of the natural cases, and probably depends on causes not yet understood. The lowest pulse rate observed was 54 (3rd May, 1916), not shown on the chart. The pulse curve follows fairly closely the first access of pyrexia, although it is relatively somewhat slow. During the second rise of temperature the pulse curve remains on approximately the normal level, indicating a definite relative bradycardia. Absolute bradycardia is not marked in this case, although on one occasion the pulse was 54. Although the temperature was moderately high and the case definitely positive (see subsequent inoculations—Cases 12 and 13), the patient's general condition was very good and he made practically no complaint. In fact he complained more after the disease than during it, stating he had "gone off his legs." The rash was very faint.

Subcutaneous injection of Serum and Corpuscles, taken on the 3rd day of the Natural Disease (Case B) and outside the body for 4 days, followed 4 days later by the Subcutaneous Injection of citrated blood taken on the 8th day of the natural disease (Case C), outside body half day. Result: Positive. Incubation period—8 days from the first injection and 4 days from the second injection.

Case 7.—J.C., m., 49, who was injected subcutaneously with 0.5 c.c. of IC. (untreated serum and corpuscles from Case B) on 8th April, 1916, at 3 p.m. and with XX (citrated blood from Case C) on 12th April, 1916, at 7.30 p.m., became suddenly ill on 16th April, 1916, at 11 a.m. with occipital headache and "shivery feelings."

- 17th April, 1916.—On examination:—Face flushed; no injection of eyes; no coryza; pharynx injected; tongue moist and coated; headache in all regions. *Rash*—A pinkish, definitely raised, erythematous rash confined to the inner sides of both thighs. Temperature, noon, 99.4 degs.; rose to 101.4 degs. at 4 p.m.; at midnight, 99.6 deg.
- 18th April, 1916.—Headache; feels better; forehead, face and neck flushed like sunburn. Slight pinkish erythematous patches on the front of the chest; large patches in the axillary line and round the waist; rash copious on the back, over the glutei and on the back of the thighs and on their front and inner aspects; slight on the legs; also present on the palmar aspects of the forearms and slightly on the upper arm. Temperature, 8 a.m., 99 deg.; noon, 98.4 deg.; midnight, 99.8 deg.
- 19th April, 1916.—Still complains of pain in the back of the neck and headache. A much more prominent, bright pink, definitely raised, erythematous symmetrical rash on the inner and front aspects of the thighs; one similar patch on the back. Highest temperature at 4 p.m., 99 deg.
- 20th April, 1916.—Feels well; copious pinkish raised patches on both thighs and both forearms; an erythematous blush on the right arm in the morning, and on the same region in the afternoon a definitely raised erythematous rash; the same appearance in the lumbar region; rash very itchy. Highest temperature, midnight, 99.8 deg.; other times normal.
- 21st April, 1916.—Feels well; rash covering most of the body, but particularly on the lumbar and gluteal regions; faint on the forearms and thighs. Highest temperatures, noon, 99 deg.; midnight, 99 deg.
- 22nd April, 1916.—Feels well; rash fading. Temperature normal.
- 23rd April, 1916.—Feels well; rash almost gone. Temperature normal.
- 25th April, 1916.—Feels well. Temperature, 4 p.m., 99 deg.; other times normal.
- 26th April, 1916.—Allowed up. Temperature normal on and after this date.
- 28th April, 1916.—Urine clear, 1020, no albumen or sugar.
- 3rd May, 1916.—Complains of pain in the knees. Fine desquamation present.
- 8th May, 1916.—Urine, 1020, acid, no albumen or sugar.

Remarks.

This case was under observation for 35 days from the first injection. The incubation period was 8 days calculated from the first injection, and 4 days from the second injection.

The chart shows some indication of a double temperature curve, with approximately 3 days between the two high readings of the temperature chart. Relative bradycardia is present in the pyrexial period, followed by absolute bradycardiac periods. Several times the pulse was 56 and on one occasion 54. Later in the record periods of bradycardia alternate with periods in which the pulse was somewhat quicker than normal. The rash in this case was a fairly distinctive one. The patient complained of great weakness after being allowed up, even up to 12th May, 1916 (26 days from the onset).

Subcutaneous Injection of Clear Serum taken on the 3rd day of the Natural disease (Case B), outside the body 4 days, followed 4 days later by a second Subcutaneous Injection of Citrated Blood taken on the 8th day of the Natural Disease (Case C) outside body half day. Result:—Negative.

Case 8.—G. McA., m., 53, was injected subcutaneously on 8th April, 1916, at 3 p.m., with about $\frac{1}{2}$ c.c. of IB. (clear serum from Case B), and on 12th April, 1916, at 7.30 p.m. with 1 c.c. of XX (Case C—see above). This case remained perfectly well, being under observation 31 days, and the temperature being taken once daily.

Subcutaneous Injection of Clear Serum taken on the third day of the Natural disease (Case B), outside the body 4 days, followed four days later by a second Subcutaneous Injection of Serum taken on the eighth day of the Natural disease (Case C), outside body half day. Result:—Positive. Incubation period:—11 days from the first injection or 7 days from the second injection.

Case 9.—J.E., m., 56, was injected subcutaneously with approximately $\frac{1}{2}$ c.c. of 1 B. (Case B.—see above), on 8th April, 1916, at 3 p.m., and on 12th April, 1916, at 7.30 p.m. with about $\frac{1}{2}$ c.c. of XZ (serum from Case C). He became ill about 11 a.m. on 19th April, 1916, with a sensation of shivering. His temperature at 8 o'clock that evening was 99.4 deg. He complained of pains between the shoulders and in the nape of the neck, with dull pains in the legs, and dizziness.

20th April, 1916.—On examination:—The face was flushed; the pharynx injected; the eyes injected. There was a suggestion of an erythema on his back, but nothing distinctive. He insisted that his trouble was influenza and a slight coryza lent additional weight to his auto-diagnosis. He was not sent to bed, but his temperature was frequently taken as shown on the chart. Temperature, 100 deg. in the morning.

21st April, 1916.—Temperature taken once, 98.8 deg.

22nd April, 1916.—Temperature taken once, 98.6 deg.

23rd April, 1916.—Temperature, morning, 99 deg.; evening, 99.8 deg.

24th April, 1916.—The patient was on leave and went to the races. He had taken a good deal of drink.

25th April, 1916.—Re-examined on this date. His face was decidedly flushed. There was no evidence of coryza. He stated he felt a feeling as if he had drunk a little too much alcohol the day before. He had general pains, headache, and some malaise. His skin was examined, the patient meanwhile protesting that there was no rash on him. The examination, however, revealed a profuse rash. This was a pinkish-coloured erythematous mottling, morbilliform in character, of the whole body including the soles of the feet, and most copious on the back. On both elbows at the same time, and less distinctly on both knees, were raised pink patches said by an observer to be the colour of "washed cosin stains."

This rash when first seen was considered distinctive enough to warrant having a water-colour record taken, but on 26th April, 1916, the earliest time on which this could be done, it had faded so considerably that this procedure was considered useless.

Temperature, morning, 100·6 deg.

26th April, 1916.—Temperature, 4 p.m., 100·6 deg.; noon, 98·6 deg.; evening, subnormal.

27th-28th April, 1916.—Feels well; rash fading; urine clear, 1020, acid, no albumen or sugar. Temperature practically normal.

29th April, 1916.—Feels well; rash fading.

1st May, 1916.—Feels well; rash fading.

2nd May, 1916.—Rash practically gone.

From 26th April, 1916, to 7th May, 1916, the temperature at times was slightly above normal.

7th May, 1916.—Temperature up to 100 deg. No notes made.

Remarks.

The incubation period is 6 days 16 hours, calculated from the second injection, or 10 days 20 hours calculated from the first injection.

The chart shows a definite saddle-back temperature with approximately 5 days between the highest points on the temperature chart. A complete pulse record was not taken.

Two things stand out prominently in this case—the extreme mildness of the symptoms and the distinctive character of the rash. The rash observed was evidently the "secondary" rash and the symptoms thought to be influenzal were the beginning of the disease. This patient made no complaint during convalescence.

Subcutaneous Injection of Washed Corpuscles, taken on the third day of the Natural Disease (Case E), outside the body less than twelve hours. Result—Negative.

Case 10.—J.D., m., 64, was injected on 14th April, 1916, at 8.30 p.m. subcutaneously with 1 c.c. of Y A (corpuscles from Natural Case E, taken on the morning of the same day, washed free from serum and citrate and suspended in normal saline). He remained well, being under observation for 33 days. His temperature was taken once daily.

Subcutaneous Injections of Serum, taken on the third day of the Natural Disease (Case E), outside the body less than 12 hours. Result—Positive. Incubation period—8 days 13 hours. Unsuccessful subinoculations from blood taken on the fourth day.

Case 11.—E.C., m., 51, was injected 14th April, 1916, at 8.30 p.m. subcutaneously with about 1 c.c. of Y B (serum of Case E), taken on the third day of the natural disease.

23rd April, 1916.—He became ill on this day with a temperature at 9.30 a.m. of 103·1 deg. He complained of frontal headache and of a feeling of "being hot all over." On examination:—Very flushed face; no coryza; no pains; tongue moist and tremulous; pharynx injected; no rash. Temperature, 8 p.m., 103·8 deg.; midnight, 102·8 deg.

24th April, 1916.—Headache; well-marked rash over the chest, abdomen, shoulders and thighs. Temperature, 4 a.m., 102·2 deg.; 8 a.m., 102·2 deg.; noon, 98·4 deg.; 8 p.m., 99·8 deg.

25th April, 1916.—Headache improved. Tongue coated and moist; appetite good. A pinkish mottled erythematous rash, morbilliform in appearance, over the whole back; on the front of the chest and abdomen; on the thighs but not the legs; and on the shoulders, arms and forearms. The rash was mostly in the upper three-fourths of the body. Temperature, 8 a.m., normal; 4 p.m., 99 deg.; 8 p.m., normal.

26th April, 1916.—Feels well. Palpable glands in the neck. Rash fading but still prominent on the back. Temperature normal on and after this date.

The subcutaneous injection of washed corpuscles and of the citrated plasma from which the corpuscles were removed, obtained from blood taken on this date, failed to convey the disease to Cases 14 and 15 respectively. The Pasteur-Chamberland filtrate from the blood also failed to convey infection to Case 19.

The blood taken on this date and used for the above injections was treated as follows. Part was citrated and the rest allowed to clot. Some of the clear serum was tested and gave a negative Wassermann reaction. The remaining serum and clot was diluted with an equal amount of a thick emulsion of *Staphylococcus aureus* in normal saline and filtered (Pasteur-Chamberland filter). The water supply failed and in this case the first filtrate coming through was spoiled. The filter was emptied and the unfiltered material collected and refiltered next day (27th April, 1916). Cultures on broth were negative, and subcultures were negative.

The

The filtrate injected into Case 19 on 28th April, 1916, gave negative results.

The citrate saline mixture was centrifuged and the supernatant fluid removed and replaced with saline. Four centrifugalizations were done and the last being incomplete at 10 p.m., 26th April, 1916, the corpuscles were put into a test tube with about 20 c.c. saline and allowed to stand in ice overnight, and in the morning were washed again twice and the corpuscles, suspended in a small amount of saline, retained. Cultures on agar and broth and subcultures from the broth from the preparation on the 26th April, and from the final preparation on 27th April, 1916, gave negative results. These corpuscles injected into Case 14 on 27th April, 1916, gave negative results. The supernatant fluid (sterile by broth and agar cultures) after the first and second centrifugalizations was used to inject Case 15 on 27th April, 1916, also with a negative result.

27th April, 1916.—Feels well; rash fading.

28th April, 1916.—Feels well; rash fading. Urine clear, 1012, acid, no albumen or sugar.

29–30th April, 1916.—Feels well; rash fading.

1st–2nd May, 1916.—Feels well; rash fading, but still noticeable on the abdomen and back.

3rd May, 1916.—Feels well; rash fading but still noticeable on the abdomen and back.

4th May, 1916.—Feels well; rash fading but still noticeable on the abdomen and back.

6th May, 1916.—Allowed up.

7th–10th May, 1916.—Complaints of headache. Urine 1020, acid, no albumen or sugar.

Remarks.

The incubation period of this case was 8 days 13 hours. The temperature chart shows a very rapid rise and fall, followed by a more gradual fall to normal, but no saddle-back. The lowest pulse-rate was 56. There is well-marked relative and later absolute bradycardia. The slowness of the pulse during the first part of the pyrexia is very marked. The patient complained of headache and general weakness during convalescence. He showed a well-marked rash, morbilliform in appearance. Subinoculations unsuccessful from washed corpuscles, citrated plasma and Pasteur-Chamberland filtrate obtained from blood taken on the fourth day.

Subcutaneous Injection of Pasteur-Chamberland Filtrate of Clot and Serum, taken on the second day of the Inoculated Disease (Case 6), one day outside the body
Result—Positive. Unsuccessful subinoculation. Incubation period—6 days 14 hours.

Case 12.—G.J., m., 47, was injected subcutaneously on 18th April 1916, at 7.30 p.m., with 3 c.c. of a Pasteur-Chamberland filtrate of clot and serum from Case 6. This blood was collected, 17th April, 1916, on the second day of Case 6's illness. He became ill suddenly on 25th April, 1916, his temperature at 9.30 a.m. being 102.2 deg., and at midday 103.3 deg. He complained of dull headache in the occipital region and vomiting, but had no pains.

On examination:—Face very flushed; tongue coated; pharynx injected; slight cough; no coryza; a fine punctate rash on the back with a definite congestion of the skin; skin very hot. Temperature at 8 p.m., 103.2 deg.; midnight, 102.2 deg.

26th April, 1916.—Cough without expectoration; eyes injected; bilious vomiting early in the morning. Definite flushing of the back with a fine rash as described. Temperature, 8 a.m., 101.2 deg.; 8 p.m., 102 deg.

The Pasteur-Chamberland filtrate from blood taken on this date, and injected eight days later, failed to produce the disease in Case 20.

The blood used for the above experiment was treated as follows:—Part was allowed to clot and filtration was attempted with a Pasteur-Chamberland filter on the same date after dilution with an equal amount of a thick emulsion of *B. prodigiosus* in normal saline. Owing to poor and intermittent water pressure this was not achieved this day. Later, 27th April, 1916, filtration was effected and cultures from the filtrate on agar and broth and subcultures from the broth remained sterile. The filtrate was used to inject Case 20 on 4th May, 1916, with negative results.

27th April, 1916.—Cough still present; slight vomiting in the morning; no pain; feels well. The fine punctiform early rash is replaced by a pink, erythematous mottling with definitely raised irregular patches on the back, chest and abdomen and splashes of erythema on the buttocks (pressure?). Temperature, 8 a.m., 100.2 deg.; midday, 102.2 deg.; 8 p.m., 100.4 deg.

28th April, 1916.—Vomiting; cough with expectoration. Complained of slight headache. Rash the same with some blotchy erythema over the upper portion of the body. Urine clear, 1015, acid, no albumen or sugar. Temperature, 8 a.m., 99 deg.; 8 p.m., 100.4 deg.

29th April, 1916.—Rash still prominent on the back and round the waist. Temperature, 8 a.m., 99.2 deg.; midday, 100.2 deg.; midnight, 99.4 deg.

30th April, 1916.—Feels well; rash still marked. Temperature, normal.

1st May, 1916.—Rash seems more marked, showing copiously on the whole of the back, the buttocks, and abdomen, and slightly on the chest and upper arms. Temperature, normal.

2nd May, 1916.—Face still very flushed; eyes red; complains of slight headache; rash still with the same pinkish mottled character and distribution. Temperature, normal.

- 3rd May, 1916.—No symptoms; rash the same. Temperature, normal.
 4th May, 1916.—No symptoms; rash fading. Temperature 99 deg. in the middle of the day.
 5th–6th May, 1916.—No symptoms; rash fading.
 7th May, 1916.—No symptoms; rash fading.
 8th–13th May, 1916.—No symptoms; rash fading. Discharged, 13th May, 1916. Temperature, noon, 99·2 deg. Urine (undated), 1025, acid, no albumen or sugar.
 The case was under observation for 28 days after the injection.

Remarks.

The incubation period was approximately 6 days 14 hours. The chart shows a modified saddle-back although the period of intermission was very short. There is also seen a tendency for the temperature to be above normal from the tenth to the sixteenth day after the onset. The pulse shows throughout the illness marked relative, and after the first week absolute, bradycardia. Indication of the recovery in pulse-rate is found during convalescence. The lowest pulse-rate was 42. The rashes were fairly prominent features. Vomiting was marked. A negative feature was no complaint of any pains at all in the body or head other than of slight headache on the fourth day. There was a fine desquamation in this case. This patient also complained for some days of general weakness during convalescence.

Subcutaneous Injection of untreated Serum and Corpuscles, taken on the second day of the Inoculated Disease (Case 6), one day outside the body. Result—Positive. Successful subinoculations. Incubation period, 6 days (approx.).

Case 13.—E.H., m., 44, was injected subcutaneously with 1 c.c. of untreated serum and corpuscles from Case 6 on 18th April, 1916, at 7·30 p.m. He became suddenly ill on the morning of 25th April, 1916, with headache, which increased in intensity during the day, and aching eyes. The patient stated he was in perfect health on 24th April, 1916. On questioning, his headache was found to be occipital but not severe. On examination:—No coryza; face flushed; hyperæmia of the pharynx; tongue furred and moist. Appetite lost.

Rash.—A few punctate spots forming a faint rash on the back and between the shoulder-blades; back congested. Temperature, 5 p.m., 101·6 deg.; 8 p.m., 101 deg.; midnight, 101·2 deg.

26th April, 1916.—Complains of pains in the back all over; slept well. Eyes injected; feels well; glands palpable in the neck. Temperature, 8 a.m., 100 deg.; midday, 102 deg.; 8 p.m., 101 deg.

The Pasteur-Chamberland filtrate of blood taken on this date and kept outside the body for eight days failed to convey the disease to Case 21. The washed corpuscles, after citration, and also the washings from these, reproduced the disease. (Cases 16, 17.) (Outside body one day.)

The blood used for the above experiments was treated in a similar way to that from Case 11 (*vide* this case), so that the filtrate, washed corpuscles, and washings were obtained.

B. prodigiosus emulsion was used to dilute the serum and clot, and filtration was successful on 26th April, 1916. Cultures from the filtrate on agar and broth and subcultures on agar from the broth remained sterile. This filtrate was injected into Case 21 with a (probably) negative result. The washed corpuscles were used to inject Case 16 on 27th April, 1916, with a positive result. Broth and agar cultures made on 26th April, 1916, from these corpuscles were sterile at the time of injection, but subsequently a slight growth appeared on the broth culture made from the final preparation. The washings (sterile by broth and agar cultures and broth subcultures), injected on 27th April, 1916, into Case 17, gave a positive result.

27th April, 1916.—Complains of pain round the lower ribs and occipital headache. Tongue still coated. A pinkish mottling on the back and the abdomen. Temperature, 4 a.m., 101·2 deg.; 8 a.m., normal; midday, 99 deg.; 8 p.m., 100 deg.

28th April, 1916.—Slept badly during the previous night; complains of pains all over the head and round the lower ribs; feels well. Eyes still injected and tongue coated. The rash is of the same character; it is copious on the back and the abdomen; slight on the chest. Urine clear, 1022, acid, no albumen or sugar. Temperature, 4 a.m., 100 deg.; 8 a.m., normal; midday, 99 deg.; 8 p.m., 100 deg.

29th April, 1916.—Feels well. The rash is copious on the back and the abdomen, and slight on the chest. Temperature, 8 a.m., 98·6 deg.; midday, 98·8 deg.; 8 p.m., 98·6 deg.

30th April, 1916.—Feels well; appetite good. Rash still copious on the abdomen and over the whole back. Temperature normal.

1st to 2nd May, 1916.—Feels well; rash the same. Temperature normal.

3rd May, 1916.—Feels well; rash fading; eyes red.

4th to 5th May, 1916.—Feels well; the rash has faded from the chest, but is still present on the back and the abdomen. Temperature normal.

6th to 7th May, 1916.—Feels well; rash fading. Temperature normal.

8th May, 1916.—Feels well; the rash has faded. The patient is allowed up. Temperature normal.

9th May, 1916.—Temperature, midday, 99 deg.

Urine (undated), 1018, acid, no albumen or sugar.

Remarks

Remarks.

This case was under observation for twenty-eight days after the injection. The incubation period was approximately six days, fourteen hours. The patient states he had had "dengue" in Tasmania—a place from which the disease has never been recorded. The chart shows an irregularly remitting febrile period, which may be regarded as a much-modified saddle-back. There is, as in the last case, a tendency for the temperature to be above normal about a fortnight after the original onset. There is marked relative bradycardia in the latter part of the febrile stage, and occasional periods of slow pulse subsequently. The lowest pulse reading was 52. The rash was fairly copious. The patient made little complaint, except during one night—that of 27th April, 1916. Washed-corpuscles and also washings from corpuscles reproduced the disease in two cases. A filtrate kept eight days proved ineffective.

Subcutaneous injection of washed corpuscles, taken on the fourth day of the inoculated disease (Case 11), outside the body one day. Result: Negative.

Case 14.—T.H., m., 59, was injected subcutaneously on 27th April, 1916, at 3.45 p.m., with 1.5 c.c. of washed corpuscles (blood received into citrate normal saline solution and corpuscles washed several times in normal saline solution), taken on the fourth day of the inoculated disease (Case 11). He remained well, being under observation twenty-nine days. The temperature was taken once daily, and was never over 98.4 deg.

Subcutaneous injection of washings of citrated plasma freed from corpuscles, taken on the fourth day of the inoculated disease (Case 11) outside the body one day. Result: Negative.

Case 15.—E.C., m., 45, was injected subcutaneously on 27th April, 1916, at 4 p.m., with 2 c.c. of the "washings" (plasma in citrate normal saline solution after removal of the corpuscles by centrifuging), taken on the fourth day of the inoculated disease (Case 11). He remained well, being under observation twenty-four days. His temperature was taken once daily. The first day after injection it was 99 deg., but thereafter it was never over 98.4 deg.

Subcutaneous injection of washed corpuscles, taken on the second day of the inoculated disease (Case 13), outside the body one day. Result: Positive (mild). Inoculation into this, a third individual, successful, but illness mild (perhaps due to a minimum of infective material). Incubation period, 5 days, 20 hours.

Case 16.—G.R., m., 55, was injected subcutaneously on 27th April, 1916, at 4.10 p.m., with 0.6 c.c. of washed corpuscles (*vide* Case 14), taken on the second day of the subinoculated disease (Case 13). He became suddenly ill whilst having dinner at 12.30 p.m. on 3rd May, 1916, with pain in the nape of the neck, headache, and dizziness. His temperature that afternoon was 99 deg., so he was sent into hospital for observation. On examination, his face was flushed, the tongue coated, the pharynx injected. There was slight cough, no coryza, no injection of the eyes. There was congestion of the skin of the back, but no rash. There were erythematous blushes round the waist, on the thighs, and on the abdomen (pressure ?).

4th May, 1916.—Pain in the back of the neck; no rash. Maximum temperature, 98.6 deg., 4 p.m.

5th May, 1916.—Pain in the head and neck; no rash. At midday his temperature shot suddenly up to 101 deg., but at 4 p.m. it was normal.

Serum obtained from blood taken on this date, mixed with similar serum from Case 17, both being kept two days outside the body, was applied by scarification of the arm, by swabbing the nostrils, and by gargling and swallowing to Cases 22, 23 and 24 respectively, with negative or very doubtful results.

6th to 8th May, 1916.—Feels well; appetite good; slept well. No rash. Temperature, normal.

9th to 11th May, 1916.—Complains of diarrhoea and pains in the lumbar region and down the legs. No rash. On 10th May, 1916, at midday, the temperature was 99.2 deg.; on 11th May, 1916, the temperature at 8 a.m. was 99.6 deg., and at midday 99.4 deg.

12th May, 1916.—Vomited during the preceding night. Temperature, 8 a.m. and midday, 99.6 deg.

13th to 14th May, 1916.—Feels well; no diarrhoea; no rash. After this date the temperature was practically normal.

17th to 22nd May, 1916.—Feels well.

Urine (undated), 1020, acid, no albumen or sugar.

Remarks.

The incubation period was five days twenty hours. This case is considered as a mild, positive one. This view is taken from the patient's appearance, symptoms, incubation period and pulse rate. The temperature chart is not typical but shows a double phase, the two high points being separated by about five days. The pulse rate was frequently low, 56 being the lowest reading, but the pulse chart is very irregular. Additional weight is lent to the view that the case is positive by the fact that some observers considered that he had a faint rash. As, however, there was nothing conclusive about the

the rash, it was not stated in the history. Material from this case was used in three special non-inoculation experiments with three doubtful results. (See Cases 22, 23, 24.)

Subcutaneous injection of citrated plasma, taken on the second day of the inoculated disease (Case 13) outside the body one day. Result: Positive. Inoculation into this, a third individual, successful. Incubation period, six to seven days.

Case 17.—W.J.W., m., 38, was injected subcutaneously on 27th April, 1916, at 4.25 p.m., with 2 c.c., of the "washings" (plasma in citrate normal saline solution after the removal of the corpuscles by centrifuging) obtained from blood taken on the second day of the sub-inoculated disease (Case 13).

3rd May, 1916.—His temperature rose on the morning of this date to 99.6 deg., and had increased to 100.6 deg. at 5 o'clock in the afternoon. He was thereupon sent to hospital, although he protested that he had no symptoms, and, in fact, never felt better in his life. On examination his face was flushed; the tongue not coated; the eyes somewhat injected; there was no coryza; the appetite was good. No rash.

4th May, 1916.—He states that the right side of his head is aching badly, and complains of pain in both heels and sleeplessness. Eyes injected; tongue coated; no rash; appetite good. Temperature, 8 a.m., 100.2 deg.; noon, 101.2 deg.; 8 p.m., 102.2 deg.

5th May, 1916.—Feels weak, but otherwise well. An erythematous blush on the forehead and right shoulder and in front of both knees. Temperature, 8 a.m., 100.2 deg.; noon, 99 deg.; 8 p.m., 101 deg.

Serum obtained from blood taken on this date and kept in the ice-chest for eight days conveyed the disease by inoculation to Case 25. Serum obtained from blood taken on this day and mixed with similar serum from Case 16, was applied by scarification of the arm, by swabbing the nostrils, and by gargling and swallowing to Cases 22, 23, and 24 respectively, with negative or very doubtful results.

6th May, 1916.—Complains of stiffness in the muscles, but nothing else. No rash. Temperature, 8 a.m., 100.8 deg.; noon, 100.8 deg.; 4 p.m., 102 deg.; 8 p.m., 102.2 deg.; midnight, 102.8 deg.

7th May, 1916.—Slight cough, but no sputum; tongue coated. A raised pinkish mottling on both shoulders, on the back, and in the region of the great trochanters, copious on the abdomen. Temperature, 4 a.m., 100 deg.; 8 a.m., 100 deg.; noon, 100 deg.; 8 p.m., 101 deg.

8th May, 1916.—Heavy sweating during the night. Eyes still injected; a reddish coat to tongue. The rash was of the same character as previously, being prominent on the back and buttocks, copious on the abdomen, slight on the chest, shoulders and arms, and fairly copious round the lower ribs. Temperature, 8 a.m., 97.4 deg.; noon, 99.4 deg.; 8 p.m., 101.6 deg.

9th May, 1916.—Sweating during the night. Rash fading.

10th to 11th, May, 1916.—Night sweating. Rash practically gone; most prominent round the lower ribs. Temperature subnormal on and after this date (taken till 16th May, 1916).

12th May, 1916.—Feels well; slight nocturnal sweating.

13th May, 1916.—Feels well but weak; no sweating.

Remarks.

The incubation period was somewhat under 6 days to the onset of fever, 7 days to the definite onset of symptoms. The temperature chart shows an irregular type of chart; the pyrexial period lasted a week and was interrupted by two definite intermissions. It may be regarded as an irregular saddle-back chart complicated by a secondary remission in the second pyrexial period due to the marked sweating which occurred. The pulse is for the most part relatively slow, and there are definite irregularly occurring periods of absolute bradycardia in the post-febrile phase. The recovery of the pulse in the later stages of convalescence is well shown. The lowest pulse rate was 50. Sweating, as above mentioned, was a pronounced symptom in this case. It is perhaps worth noting that his temperature rose definitely a day before the onset of symptoms.

Sub-inoculation of serum was successful.

Subcutaneous Injection of Pasteur-Chamberland Filtrate from blood, taken on the sixth day of the Natural Disease (Case D), kept on ice 4 days, filtered, outside body 7 days. Result: Negative.

Case 18.—J.T., m., 64, was injected subcutaneously on 28th April, 1916 at 7.45 p.m., with 2 c.c. of the Pasteur-Chamberland filtrate from the diluted blood of Case D. This blood was taken on the sixth day of a severe case of dengue and was kept on ice for 4 days, filtered and was outside the body 7 days from the time of inoculation. This case remained well. His temperature was taken once daily for 27 days and was only normal or subnormal, except once when it was 98.8 deg. (20th day).

Subcutaneous Injection of Pasteur-Chamberland Filtrate from blood, taken on the fourth day of the Inoculated Disease (Case 11), 2 days outside the body. Result: Negative.

Case 19.—E. McS., was injected at 8 p.m. on 28th April, 1916, with 2 c.c. of a Pasteur-Chamberland filtrate of the blood from Case 11, taken on the fourth day of the disease and kept 2 days outside the body. 29th

29th April, 1916.—His arm was swollen and painful, and the temperature at 8 p.m. was 101 deg.; midnight, 100·4 deg.

30th April, 1916.—Arm still swollen and sore. Temperature, 4 a.m., 99·8 deg.; 8 a.m., subnormal; noon, 98·6 deg.; 8 p.m., 99 deg.

1st May, 1916.—Arm better with some areola. Temperature, 4 a.m., 99·2 deg.; 8 a.m., subnormal.

2nd May, 1916.—Arm well. Temperature normal.

The patient's temperature was taken four hourly until 10th May, 1916, and once daily until 23rd May, 1916, without showing any increase above the normal, and no symptoms occurred.

Remarks.

The temperature of 101 deg. on the morning following the injection was almost certainly due to some toxic body in the injected material, probably unconnected with dengue.

Subcutaneous Injection of Pasteur-Chamberland Filtrate from blood taken on the second day of the Inoculated Disease (Case 12), outside the body 8 days. Result:—Negative.

Case 20.—J.P., m., 36, was injected subcutaneously on 4th May, 1916 at 6.10 p.m.; with 2 c.c. of the Pasteur-Chamberland filtrate of Case 12, the blood being taken on the second day of the inoculated disease (26th April, 1916) and kept in the ice-chest for 8 days. He remained well. On 6th May, 1916, his temperature was recorded as 99·6 deg., but taken once daily for 15 days after this it did not rise above normal.

Subcutaneous Injection of Pasteur-Chamberland Filtrate from blood taken on the 2nd day of the Inoculated Disease (Case 13), outside the body 8 days. Result: Negative.

Case 21.—W.F., m., 63, was injected subcutaneously on 4th May, 1916, at 6.30 p.m. with 2 c.c. of the Pasteur-Chamberland filtrate from blood taken on the 2nd day of the inoculated disease (Case 13) and kept in the ice-chest for 8 days. His arm became swollen and sore the next morning, and his temperature went up, reaching a maximum at 5 o'clock in the afternoon of 100 deg. This pyrexia was attributed to the presence of toxic bodies in the filtrate, probably independent of the virus of dengue.

The temperature was further taken until 3rd Jun., 1916 (30 days), and during that period he showed occasional periods of pyrexia, viz.—on 18th May, 1916, to 99·3 deg., and on 27th May, 1916, to 100·8 deg. These were considered as being independent of the injection of the filtrate.

Scarification of the Arm, as for ordinary vaccination, and application of mixed serums from Cases 16 and 17, taken on the third day of the Inoculated Diseases, 2 days outside the body. Result:—Negative (?). Incubation period (if any)—7 days.

Case 22.—A.C., m., 19, was vaccinated as with calf lymph on the arm with the mixed serums of Cases 16 and 17, taken on the 3rd days of the inoculated diseases, 2 days outside the body, on 6th May, 1916, and was sent into hospital for observation on 13th May, 1916. His maximum temperature on this date was 98·8 deg.

14th May, 1916.—Complains of headache; otherwise no other symptoms or signs. Temperature subnormal.

15th May, 1916.—Feels well; no rash. Temperature subnormal.

16th May, 1916.—Face a little flushed; eyes slightly injected; no rash, but a congestion erythema of the back and erythematous flushes on the buttocks (pressure). Temperature at noon rose to 99·4 deg.; 4 p.m., subnormal.

17th May, 1916.—Tongue clean. A doubtful faint mottling on the back and thighs. The temperature at 4 p.m. rose to 99 deg.; afterwards it was subnormal.

18th May, 1916.—Diarrhoea; tongue slightly coated; suggestion of a mottled rash on the back, chest and abdomen. Temperature normal or subnormal on this date and subsequently.

19th May, 1916.—Feels well; no rash.

20th to 23rd May, 1916.—Feels well; no rash.

24th May, 1916.—Feels well, except for aching eyes.

25th May, 1916.—Allowed up.

Urine (undated), 1020, alkaline, no albumen or sugar.

Remarks.

The incubation period, if any, would be 7 days. The highest temperature shown was 99·4 deg. and the lowest pulse rate 52. There seems to have been some reaction in this experiment, but so slight that the case must be accepted with due reserve. The vaccination gave no local reaction.

Nostrils swabbed with the mixed Serums of Cases 16 and 17, taken on the third days of the Inoculated Diseases, 2 days outside the body. Result:—Negative.

Case 23.—R.K., m., 48. The mixed serums from Cases 16 and 17 obtained from blood taken on the 3rd days of the inoculated diseases, kept in the ice-chest 2 days, were applied by swabbing to each nostril on 6th May, 1916. The patient was sent into hospital for observation on 13th May, 1916.

14th May, 1916.—No symptoms complained of. On examination, there were no signs.

The maximum temperature was 98·8 deg.

15th

- 15th and 16th May, 1916.—No symptoms complained of. On examination, there were no signs. The maximum temperature was 99 deg.
 16th May, 1916.—Urine clear, 1015, acid, no albumen or sugar.
 17th May, 1916.—Feels well; tongue slightly coated; skin reaction to pressure very definite on the back, buttocks and shoulders. Suggestion of a pinkish mottling on the back, chest and abdomen. Temperature, normal.
 18th May, 1916.—Face slightly flushed; eyes injected; tongue coated; rash (?), same distribution. Temperature normal on and after this date.
 19th May, 1916.—Feels well; rash (?) the same.
 20th May, 1916.—Feels well; rash (?) faint on the back and chest.
 21st May, 1916.—Feels well; rash (?) faint on the back and chest.
 22nd May, 1916.—Feels well; allowed up; urine 1025, acid, no albumen or sugar.

Remarks.

There was no certainty as to the presence of a rash in this case, and the general reaction, if any, was so slight that the case must be considered as negative.

The Throat gargled with a mixture in milk tinted with liquorice of the mixed serums of Cases 16 and 17, obtained from blood taken on the third days of the Inoculated Diseases, 2 days outside the body, the mixture being then swallowed. Result:—Positive (?). Incubation period (if any):—7 days.

Case 24.—m., 30. On 6th May, 1916, gargled his throat with and then swallowed a mixture in milk tinted with liquorice of the mixed serums of Cases 16 and 17, obtained from blood taken on the 3rd days of the inoculated diseases, and kept for 2 days in the ice-chest.

- 13th May, 1916.—Owing to the presence of a fine punctate rash on the back, chest and both arms, he was sent into hospital. He complained of no symptoms. Temperature at noon, 98·6 deg.
 14th May, 1916.—Complains of headache; rash fainter; no flushing of the face. Temperature all day normal or subnormal.
 15th May, 1916.—No symptoms; tongue coated; eyes slightly injected. Temperature at 4 p.m., 98·8 deg.
 16th May, 1916.—Temperature at noon rose to 100·4 deg., but normal before and after this.
 17th May, 1916.—Pains in the legs. A morbilliform rash on the chest, the abdomen and back; raised pinkish patches on the buttocks and thighs; pink erythematous slightly raised blushes on the elbows; tongue coated and furred. Temperature normal or subnormal.
 18th May, 1916.—Pains in the right arm; strange in manner (the patient is epileptic); face slightly flushed; morbilliform rash fading. Temperature, 99 deg. at 8 a.m., otherwise normal.
 19th May, 1916.—The morbilliform rash gone; pinkish definitely raised patches on the buttocks and the back; nil on the chest, abdomen, legs and arms.
 20th May, 1916.—Rash on back fading.
 21st May, 1916.—Rash faded; feels well.

Remarks.

The incubation period, if any, would be about 7 days. This case may possibly be considered as a mildly positive one. There were practically no symptoms but the character of the rash, the bradycardia (lowest pulse reading 52), and the presence of slight fever (100·4 deg. on 16th May, 1916) support this view.

The patient insisted on his discharge on 22nd May, 1916, so we were unable to ascertain by inoculation whether any immunity had been established. A urinalysis was not obtained.

Subcutaneous Injection of Serum, obtained from blood taken on the third day of the Inoculated Disease, 7 days outside the body (Case 17). Result:—Positive. Inoculation into this, a fourth individual, successful. Relapse. Incubation period—9 days.

Case 25.—L.J., m., 52, was injected at 7.45 p.m. on 12th May, 1916, with (amount not stated) of the serum obtained from blood taken on the third day of the inoculated disease (Case 17), kept in the ice-chest for 7 days. He became suddenly ill about 7 p.m. on 21st May, 1916, with headache, dizziness and pains in the legs. The temperature at midday was 97·6 deg.; the evening temperature was not taken.

- 22nd May, 1916.—Face flushed; tongue clear; eyes slightly injected; no coryza; no rash. Temperature, noon, 102 d g.; 4 p.m., 103 deg.; 8 p.m., 103 deg.; midnight, 103 deg.
 23rd May, 1916.—Sleeplessness; no headache. A faint punctate rash on the back and abdomen. Temperature, 4 a.m., 102·2 d g.; 8 a.m., 101 deg.; noon, 100·2 deg.; 8 p.m., 98·6 deg.
 24th May, 1916.—Pains in the lumbar region; eyes injected; sleeplessness. A faint rash on the back. Temperature, 4 a.m., 99·6 deg.; 8 a.m., 99·6 deg.; 8 p.m., 100 deg.

Blood used as a gargle and then swallowed, taken on this date failed to convey the disease to Case 26.

- 25th May, 1916.—Feels well but suffering from sleeplessness. A faint pinkish mottling in the lumbar region and on the thighs. Temperature, 8 a.m., 98.4 deg.; 8 p.m., 99 deg.
- 26th May, 1916.—Rash—pinkish mottled patches on the chest and abdomen, particularly in the lumbar area and on the sides of the chest; more definitely raised pinkish masses on both thighs (symmetrically placed). Temperature, 8 a.m., 98.4 deg.; 8 p.m., 98.6 deg.
- 27th May, 1916.—Slept better. Rash the same. Temperature normal from this date until 5th June, 1916.
- 28th May, 1916.—Rash disappearing; slightly present still on the back and legs.
- 29th May, 1916, to 2nd June, 1916.—Feels well. Rash disappearing.
- 3rd June, 1916.—Rash gone; allowed up.

Relapse?—The patient had been walking about for a few days, feeling well, when he became suddenly ill with very severe headache and a high temperature.

At noon on 5th June, 1916, his temperature rose to 99.8 deg.; at 4 p.m. it was 101.8 deg., and at 8 p.m. and midnight, 103 deg.

- 6th June, 1916.—On examination—Face flushed; eyes watery. Temperature, 4 a.m., 102 deg.; 8 a.m., 101 deg.; noon, 100.2 deg.; 4 p.m., 100.8 deg.; 8 p.m., 99 deg.; midnight, 98 deg.

- 7th June, 1916.—Slight headache; slept well; copious night sweats (patient says 3 or 4 pints.) Temperature normal or subnormal.

- 8th June, 1916.—Feels well; no sweating; no rash. Temperature at noon, 99.2 deg.; 4 p.m., 101 deg.; falling at 8 p.m. to 100 deg.; normal at midnight.

- 9th June, 1916.—Feels well. Temperature reached 99.2 deg. at 4 p.m. (maximum).

- 10th June, 1916.—Slight cough. Temperature reached 100 deg. at midday, and at 4 p.m. was 99 deg.; at 8 p.m. and thereafter during convalescence normal or subnormal.

- 11th June, 1916.—Slight sweat and cough. Urine 1016, alkaline, no albumen or sugar.

- 13th to 15th June, 1916.—Feels well; slight cough.

- 16th June, 1916.—Feels well.

- 21st June, 1916.—Urine clear, 1015, neutral, no albumen or sugar.

The urine tested on two other previous occasions during the course of this case showed—(a), 1010, acid, no albumen or sugar; (b), 1016, alkaline, no albumen or sugar.

Remarks.

The incubation period of the first attack is 9 days, and a relapse occurred 15 days later. The chart shows a single temperature curve during the first attack, and a typical double curve, with a period of apyrexia of two days, during the relapse. The pulse shows considerable relative and occasional absolute bradycardia. We have described this case as consisting of a single pyrexial period followed 15 days later by a relapse, but one might consider the two phases as an example of an exaggeration of the two-phase characteristic with a very prolonged intermission.

Blood taken on the fourth day of the inoculated disease (Case 25), used as a Gargle and then Swallowed. Result—Negative. Subsequently, Subcutaneous Inoculation of Serum and Corpuseles, obtained on the 3rd day of the Mosquito-conveyed Disease (Mosquito Case No. 5). Result—Positive. Incubation Period: 8 days 12 hours.

Case 26 (32).—G.D., m., 67, on 24th May, 1916, gargled his throat with and then swallowed a mixture composed of milk tinted with liquorice and blood taken on the 4th day of the inoculated disease (Case 25), used immediately. At 8 p.m. on 2nd June, 1916, he was injected with .5 c.c. of serum and corpuseles taken on the 3rd day of the mosquito-conveyed disease ("B.B.," Mosquito Case No. 5), outside the body several hours. He remained perfectly well and free from any symptoms until 2nd June, 1916.

- 2nd June, 1916.—Headache; coated tongue; appetite good; face flushed; congestion erythema on the back. Maximum temperature, 98.8 deg.

- 3rd June, 1916.—Feels well. Maximum temperature, 98.8 deg.

- 4th June, 1916.—Flushed face; pharynx injected; eyes watery; feels well; no rash. Temperature normal.

- 5th June, 1916.—Feels well. Maximum temperature, 99 deg.

- 6th June, 1916.—Maximum temperature, 99 deg.

- 7th June, 1916.—Some pains in the arms. Temperature, normal.

- 8th June, 1916.—Feels well. Temperature normal.

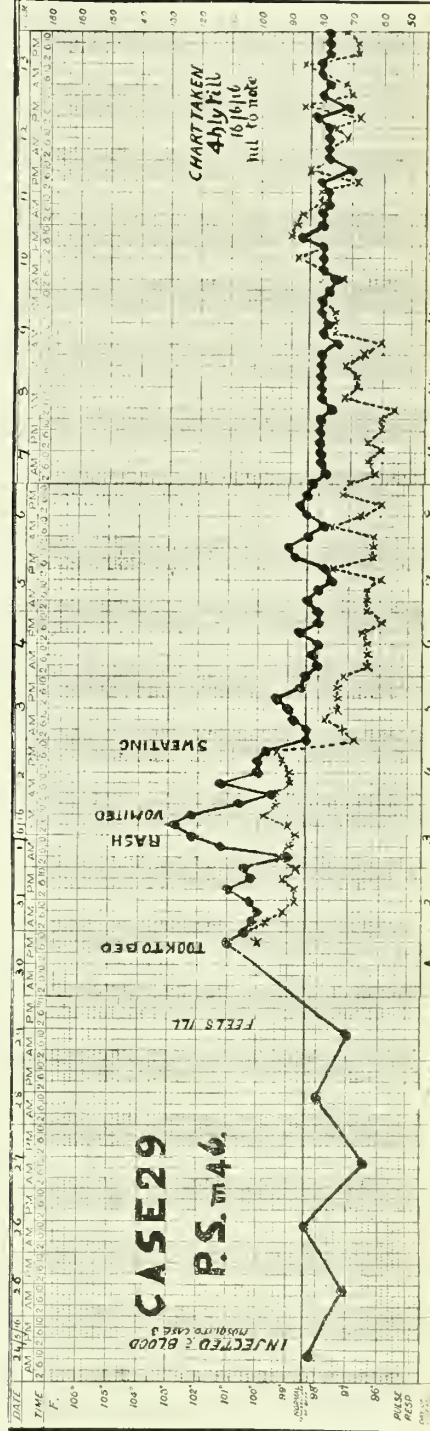
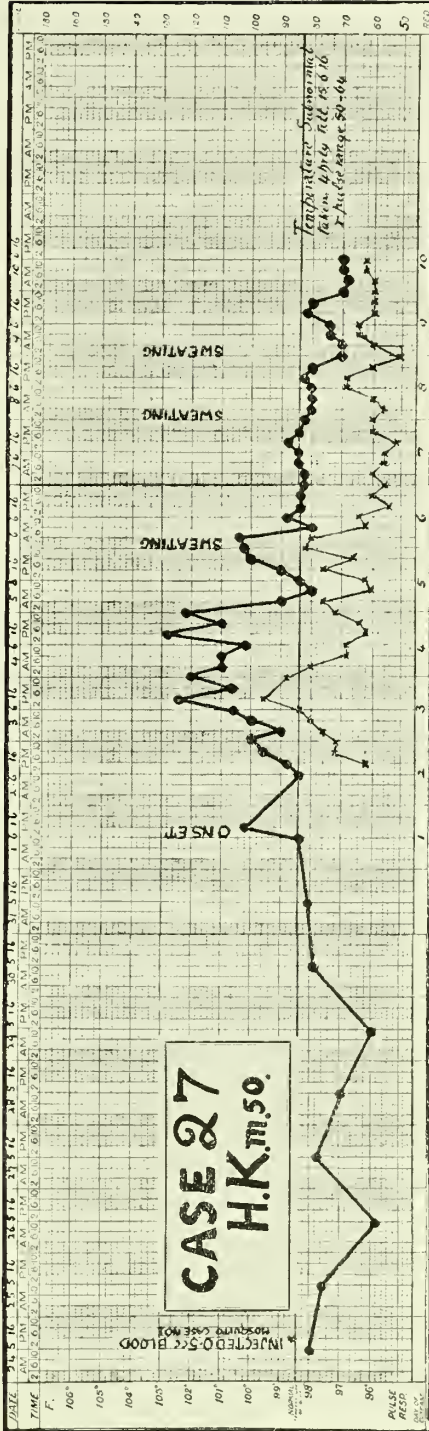
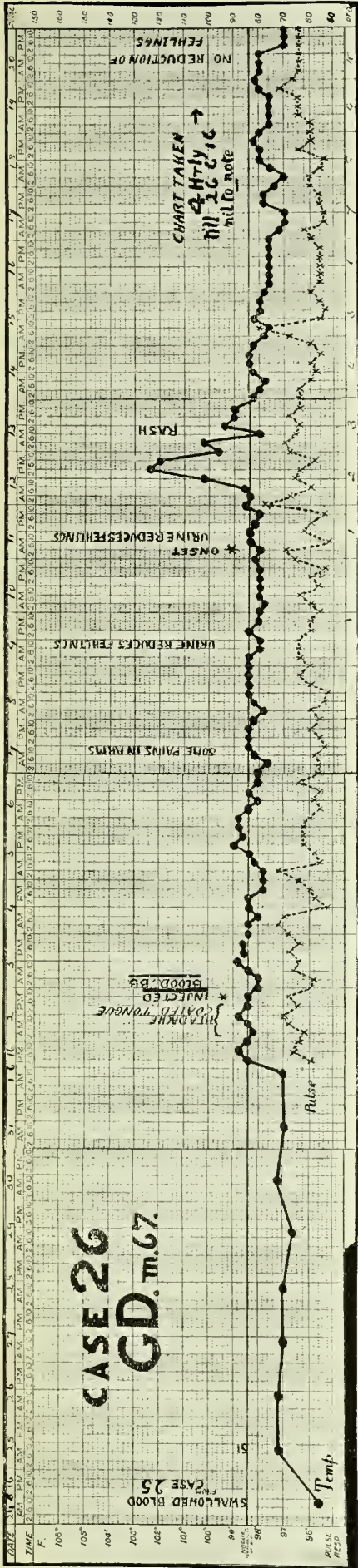
- 9th June, 1916.—Feels well. Urine 1030, acid, no albumen, Fehling's solution reduced.

- 10th June, 1916.—Feels well. Temperature normal.

- 11th June, 1916.—He became definitely ill at 8 a.m. with headache and aching eyes; the tongue was coated; the eyes injected; the face flushed; there was no rash. Urine 1025, acid, no albumen, Fehling's solution reduced. Temperature normal.

- 12th June, 1916.—Headache and pains all over the body especially in the arms and shoulders. In the afternoon he complained of pains in the knees and more intense headache and aching eyes. Temperature, 8 a.m., 98.6 deg.; 12 noon, 100 deg.; 2 p.m., 102.6 deg.; 4 p.m., 102.4 deg.; midnight, 99.6 deg.

- 13th June, 1916.—Headache; faint mottling on the chest and abdomen. Temperature 4 a.m., 100.2 deg.; 8 a.m., subnormal; noon, 99.4 deg.; 8 p.m., 99 deg.



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14th June, 1916.—Faint mottling on the chest, back and abdomen. A heavy night sweat. Temperature normal after this date.
 15th June, 1916.—Faint rash on the back, chest and abdomen.
 16th June, 1916.—Feels well. Rash the same as on the previous day; itchy.
 17th to 19th June, 1916.—Rash still the same—pinkish irregular mottled patches on the chest, abdomen and upper arms, doubtfully raised.
 20th June, 1916.—Feels well. Rash the same. Urine 1017, acid, no albumen or sugar.
 21st to 23rd June, 1916.—Feels well. Rash on the back.
 23rd to 26th June, 1916.—Feels well. Rash on the back.

Remarks.

The incubation period is 8 days 12 hours from the date of the injection to the onset of symptoms, and a little over 9 days till the first rise of temperature. The reaction to the swallowing was very slight, if any, and must be considered as a negative result.

The reaction to the injection was very definite, and was certainly positive (compare appearance, symptoms, rash and temperature).

An interesting feature was that the patient complained of typical symptoms twenty-eight hours prior to any elevation of the temperature.

The temperature chart shows a single phase febrile paroxysm. There is marked relative bradycardia, and the pulse rate tends to be slow throughout. It will be noticed, however, and we shall have more to say in this connection in discussing the pulse in these cases, that there is quite definitely a tendency to slow pulse well before the beginning of the attack.

The urinalysis in this case was very surprising, the specific gravity on 9th June, 1916, being 1030, and a reduction with Fehling's solution taking place. Tested on 11th June, 1916, similar results were obtained; but on 20th June, 1916, the specific gravity was 1017, and there was no reduction of Fehling's solution.

Subcutaneous inoculation of blood taken on the second day of the mosquito-conveyed disease (Mosquito Case II), outside the body four days. Result: Positive. Incubation period: Seven days twenty-one hours.

Case 27.—H.K., m., was injected subcutaneously on 24th May, 1916, at 3 p.m. with 0.5 c.c. of the blood of J.G. (Mosquito Case II), taken on the second day of illness (20th May, 1916), and kept in an ice-chest for four days.

This patient became suddenly ill after dinner (midday) on 1st June, 1916, suffering with headache and aching limbs. Temperature, morning, 98.4 deg.; afternoon, 100.2 deg.

2nd and 3rd June, 1916.—On examination: Flushed face, coated tongue, watery eyes, no coryza, loss of appetite, sleeps well, feels "shivery all over." No rash. Temperature on morning of 2nd June, 1916, 98.4 deg.; 8 p.m., 99.6 deg.; midnight, 100 deg. Temperature, 3rd June, 1916, 8 a.m., 100 deg.; noon, 100.6 deg.; 4 p.m., 102.8 deg.; 8 p.m., 100.6 deg.; midnight, 102 deg.

4th June, 1916.—Headache severe; feels "shivery"; tongue coated; flushing of the skin of the back; no rash. Temperature, 8 a.m., 100 deg.; 4 p.m., 102.8 deg.; 8 p.m., 101 deg.; midnight, 102.2 deg.

5th June, 1916.—Headache; aching in shoulder muscles; eyes still watery; tongue clearing; no rash. Urine clear, 1018, acid, no albumen or sugar. Temperature, 4 a.m., 99 deg.; 8 a.m., subnormal; noon, normal; 4 p.m., 99 deg.; midnight, 100.2 deg.

6th June, 1916.—Headache; aching in the shoulder muscles; heavy sweating the previous night. Temperature, 4 a.m., 100.4 deg.; 8 a.m., subnormal; midday, 98.8 deg.; afternoon, normal.

7th June, 1916.—Feels warm; eyes watery; tongue clearing. Highest temperature at 4 p.m., 98.8 deg.; temperature normal after this.

8th June, 1916.—Heavy sweat during the previous night; feels weak; eyes watery.

9th June, 1916.—Heavy sweat during the previous night; dizziness; slept well.

10th to 13th June, 1916.—Feels well; eyes still watery; appetite poor; no rash.

14th June, 1916.—Aches in the back of the head.

15th June, 1916.—Discharged.

19th June, 1916.—Urine clear, 1020, acid, no albumen or sugar.

Remarks.

The incubation period is nearly eight days (seven days twenty-one hours). The temperature chart shows an irregular chart with two remissions before the final fall. The pulse shows definite relative and later on some absolute bradycardia. The lowest pulse recorded was fifty. There was no rash. During convalescence the patient complained of marked general weakness.

Subcutaneous inoculation of blood, taken on the fourth day of the mosquito-conveyed disease (Mosquito Case II) outside the body two days. Result: Negative (?).

Case 28.—N.M., 63, was injected subcutaneously on 21st May, 1916, with 1 c.c. of the blood of J.G. (Mosquito Case No. II), taken on the fourth day of illness (22nd May, 1916). His temperature was taken once daily. On the fourth, eighth, ninth, eleventh and twelfth days it is recorded as being 99 deg. On the fifteenth day the temperature was 99.2 deg. in the morning and 102 deg. in the afternoon; on the sixteenth day 100 deg.

in the morning and 102 deg. in the afternoon; on the seventeenth day 100 deg. in the morning and 100·8 deg. in the afternoon; on the eighteenth day, 99·2 deg. in the morning, and 101 deg. in the afternoon. After this the temperature, taken once daily until the twenty-second day, was normal.

There are no notes in this case of any symptoms like those of dengue.

Subcutaneous inoculation of blood, taken on the second day of the mosquito-conveyed disease (Mosquito Case No. III), two days outside the body. Result: Positive. Incubation period: Five days twenty-one hours.

Case 29.—P.S., m., was injected subcutaneously on 24th May, 1916, at 3 p.m., with 1 c.c. of blood from W.M. (Mosquito Case No. III), taken on the second day of illness (22nd May, 1916).

The patient states he felt unwell, feeling drowsy and having aching eyes, about 1 p.m., on 29th May, 1916. He took to his bed about 6 p.m. on 30th May, 1916, his temperature being 101 deg.

31st May, 1916.—He complains of pain in the head, back, thighs and hips, and sleeplessness. On examination: The face was slightly flushed; the eyes injected; the tongue coated; no coryza; no cough; no rash, but a congestion erythema of the back. Temperature, 8 a.m., 100 deg.; 4 p.m., 101 deg.; midnight, 100·4 deg.

1st June, 1916.—Marked headache; aching eyes; pains all over the body; the pharynx injected; slight cough; a pinkish, raised erythematous mottling, irregularly arranged around little islets of white, was copious on the back, chest, abdomen, buttocks, thighs and shoulders (*vide* Water-colour Sketch). Temperature, 4 a.m., 99·8 deg.; 8 a.m., 101·2 deg.; noon, 102·2 deg.; 4 p.m., 102·8 deg.; 8 p.m., 102 deg.; midnight, 100·6 deg.

2nd June, 1916.—No symptoms; tongue coated; cough; vomiting during the previous night. Rash the same as on the previous day. Temperature, 4 a.m., 99·3 deg.; 8 a.m., 101·2 deg.; noon, 100 deg.; 8 p.m., 99·8 deg.; midnight, normal.

3rd June, 1916.—Feels well; profuse sweating during the previous night; rash still copious on the back, chest, shoulders, abdomen and thighs. Temperature, 8 a.m., 98·8 deg.; 4 p.m., 99·4 deg.; midnight, normal.

4th June, 1916.—Feels weak; rash fading, except on the shoulders. Temperature normal.

5th June, 1916.—Feels well; rash has disappeared, except from the shoulders. Temperature, normal in the morning, rising to 99 deg. at midnight; after this date it was normal.

6th June, 1916.—Still weak. Rash has disappeared, except from the shoulders.

7th and 8th June, 1916.—Still weak. Rash has disappeared, except from the shoulders.

9th June, 1916.—Still weak. Rash has disappeared, except from the shoulders.

10th June, 1916.—Feels well. Rash has disappeared, except from the shoulders.

11th and 12th June, 1916.—Feels well. Rash has disappeared, except from the shoulders.

Slight sweating on the night of 11th June, 1916.

15th June, 1916.—Feels well. Rash still on the shoulders, but it was faint on his discharge on this date.

Remarks.

The incubation period was about five days to the first symptom, and just over six days to the time he took to bed. The temperature chart is irregular and shows two intermissions. The pulse shows relative bradycardia in the febrile stage and later tends to be slow. The lowest pulse reading was 56. This case was definitely positive.

Subcutaneous inoculation of serum and corpuscles from blood taken on the third day of the mosquito-conveyed disease (Mosquito Case V), inoculated the same day into a subject who had recovered from the inoculated disease (Case 13). Result: Negative.

Case 30.—Case 13, who had reacted positively to dengue material injected on 18th April, 1916, becoming ill on 24th April, 1916, and being discharged on 9th May, 1916, was reinjected subcutaneously on 2nd June, 1916, with 0·5 c.c. of serum and corpuscles from Mosquito Case No. V ("B.B."), taken the same day, the third day of B.B.'s illness. Although this blood has produced a typical positive result in Case 26, no result followed the reinjection in this case. The temperature was taken once daily for fourteen days. Only on one day (6th June, 1916) was the temperature above normal, being on that day 99·6 deg. in the morning and 99·2 deg. in the afternoon.

The result of the reinjection was negative.

Subcutaneous inoculation of serum and corpuscles from blood taken on the fourteenth day of the mosquito-conveyed disease (Mosquito Case No. V), outside the body several hours. Result: Negative.

Case 31.—G.R., m., 49, was injected subcutaneously on 13th June, 1916, with eight minims of serum and corpuscles from Mosquito Case No. V ("B.B."). This blood had been taken the same day, the fourteenth day of B.B.'s illness. No symptoms followed. The case was under observation at least nine days, and the temperature taken once daily did not rise above the normal.



CASE 29.—Watercolour sketch of the rash of a patient who developed Dengue after inoculation of blood from the mosquito-conveyed disease (Case No. III).

London
Printed by
J. Smith
1847

7. A CONTRIBUTION TO THE EXPERIMENTAL PATHOLOGY OF ACUTE POLIOMYELITIS (INFANTILE PARALYSIS).

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INTRODUCTION.

THE leading features of this communication are, firstly, the positive diagnosis by laboratory methods of a previously doubtful case of Acute Poliomyelitis (Infantile Paralysis); secondly, an example of the successful transmission of the human disease to a monkey by intraperitoneal injection of unfiltered spinal emulsion; thirdly, an example of a failure similarly to transmit the disease when the emulsion was filtered; fourthly, an experimental failure to transmit the disease by means of the *Stomoxys calcitrans*; and lastly, illustrations of the histopathology of the human disease in an early stage, and of the experimental disease as it appeared in a monkey.

It cannot be claimed that the communication brings to light any unknown facts concerning Acute Poliomyelitis, but we feel that its publication is justified, in the first place because opportunities seldom arise for the pathological examination of the nervous system in acute stages of this disease, and secondly, the experimental researches of Flexner and his collaborators at the Rockefeller Institute, of Levaditi at the Pasteur Institute, and of several others on the Continent, are so recent as to be of acute interest, and so important and so technically delicate as to call for repetition by others.

REPORT OF A CASE OF HUMAN POLIOMYELITIS.

On 6th April, 1916, by direction of the Coroner of Sydney, Dr. A. A. Palmer conducted a *post mortem* examination of a boy, R.G.R., aged 6 years, who had died after two days' illness with obscure symptoms. He had had a high temperature, headache, and furred tongue.

The body was thin, and the teeth irregular and notched. There was a good deal of frothy mucus in the air passages; the lungs were cedematous, and their lower lobes deeply congested. There were some yellow patches on the mitral and aortic valves. The liver was congested and firm; the spleen enlarged and firm; the right kidney was absent, and the left kidney enlarged and congested. (Albumen was present in the urine.) The mucous membrane of the duodenum was intensely congested and the mesenteric glands were enlarged; the thymus also was enlarged. The brain was congested.

The fact that at the time this examination was made a moderately extensive epidemic of infantile paralysis was on its wane, together with the obscure symptoms of the case and the rapid death, directed special attention to the possibility of the case being one of acute poliomyelitis. The cord was consequently removed and on naked-eye examination the unusual pink appearance strengthened suspicion.

The spinal cord and various organs were then submitted to the Microbiological Laboratory for detailed examination with the following results:—

The heart showed patches of atheroma in the inter-ventricular septum and in the aorta. Microscopical examination of a section of the wall near the apex showed no special changes. The liver showed nothing notable macroscopically or microscopically. A portion of lung submitted was red and oedematous; nothing special was noted microscopically. The spleen was enlarged to about $3\frac{1}{2}$ in. by $2\frac{3}{4}$ in., was red and congested, and showed marked prominence of the Malpighian bodies; no special changes were noticed microscopically. The right kidney was absent; the left was large. The only change seen microscopically was congestion of the capillaries. The mesenteric glands were enlarged and firm, and showed no special microscopical changes. The thymus was about 2 in. long by about $1\frac{1}{4}$ in. broad, but showed no special microscopic changes. In the spinal cord the meninges were very pink, whilst the grey matter was deeply coloured, and very clearly marked. Portions of the spinal cord were cut from four different levels for microscopical examination, the details of which will be given later, whilst the rest was ground up with 50 c.c. of 1 in 3 glycerine and normal saline solution.

MONKEY INOCULATED WITH AN EMULSION OF HUMAN SPINAL CORD FROM A CASE OF ACUTE POLIOMYELITIS.

A large monkey, *Macacus cynomolgus*, was inoculated intraperitoneally on 24th May, 1913, with about 5 c.c. of the abovementioned emulsion.

30th May.—To this date the animal continued active and healthy, and took its food well.

31st May.—At 9 a.m. the monkey was noticed to be very quiet. He was undisturbed. At 11.30 a.m. he was found to be markedly paretic in both hind limbs. On moving he flopped from one to the other side of the loins. He was able to draw himself up to the bars of the cage by the hands and legs. In the afternoon he was found lying on one side.

1st June.—He was lying on his side. He could not raise himself higher than his arms; he was quite paretic in the hind limbs, but the tip of the tail occasionally moved. The rectal temperature was 37.75 deg. C. 2nd

2nd June.—His condition was worse. The hind limbs were now quite paralytic. There was slight movement in the tip of the tail. The arms had become flaccid, but he was able to move them slightly and partly raise himself. He could move the head normally and yawn. The rectal temperature at 4.30 p.m. was 34 deg. C.

3rd June.—Still lying down. He could just move slightly the arms, which were now very paretic. The eyebrows and face were alert and moveable. The temperature was 35 deg. C.

4th June.—The hind limbs fell heavily when lifted. The tail showed slight movements of the tip when moved by someone, but these were apparently purposeless. He could not move the forearms himself, but when these were lifted up they did not fall so heavily as the hind limbs. Movements of the head were apparently normal, and food was eaten when placed in the mouth. He gave no indication of pain when a number of *Stomoxys calcitrans* confined in a tube were allowed to bite his side, but continued eating his food while being thus bitten. From being a monkey dangerous to handle he now gave a chuckle of pleasure when patted. He seemed to-day a trifle better. The temperature was 34.8 deg. C.

5th June.—He was much the same. The temperature was 34 deg. C.

6th June.—Perhaps a slight improvement in the fore-limbs. The temperature was 34 deg. C.

7th June.—The hind limbs were completely flaccid, falling heavily on lifting. The fore-limbs were paretic, but showed some tonicidity when they were let go, falling less heavily than the hind limbs. They also showed occasional slight movements. Movements of the face and neck were normal, and he ate well when food was placed in his mouth. When food was placed in his hand he tried to move his head towards it, but could not move the hand towards the mouth. Dr. George Rennie kindly examined him on this occasion. Knee jerks were absent, but an ankle jerk was present. There was a slight periosteal reflex in the fore-limbs. There was no elbow jerk. He was apparently entirely insensitive to pain (pin pricks) up to a transverse line behind the fore limbs. In front of this, and in the fore-limbs, slight pain was evidenced by the physical expression. This evidence of pain became more definite as the head was approached. He had been passing a little blood in the urine during the last few days.

8th June.—The arms could perhaps be moved a little more freely. The temperature was 34 deg. C. At 3 p.m. he was killed.

Post Mortem Examination.—The spleen, liver, heart, and lungs were found normal; the kidneys were slightly congested; the salivary glands were apparently normal. There were no enlarged Peyer's patches in the intestines; the bladder was normal. The brain appeared slightly congested. There was perhaps a slight excess of clear cerebro-spinal fluid in the spinal cord. The upper part of the spinal cord appeared normal, but from the mid-dorsal area downwards seemed softer than usual. In the lumbar enlargement this softening was definite and the grey matter appeared deeply congested. Sections of the liver showed microscopically nothing special. The kidneys showed congestion of the capillaries, whilst the mesenteric glands showed the presence of some blood pigment in the walls of the medulla. The details of the microscopic examination of the spinal cord are given later.

MONKEY INOCULATED WITH THE SAME EMULSION AS MONKEY NO. 1, BUT AFTER FILTRATION THROUGH A PASTEUR-CHAMBERLAND FILTER.

This small *Macacus* was inoculated at the same time as the large animal on 24th May, 1916, with the same material after it had passed through a Pasteur-Chamberland filter F. It never manifested any evidence of illness or paresis.

THE MONKEY ON WHOM STOMOXYS CALCITRANS WERE FED AFTER FEEDING ON THE MONKEY INOCULATED WITH THE VIRUS OF ACUTE POLIOMYELITIS.

The monkey used in this experiment had a "withered" left arm which was flexed at the elbow and the wrist. He was kept in a separate room in a quite different part of the building to the inoculated monkey.

On 1st June, 1916, about 300 *Stomoxys calcitrans* (see Appendix) caught in the neighbourhood of the Abattoirs, near Sydney, were allowed to bite the inoculated monkey. This was the day after the first development of its illness. At noon on 2nd June the *Stomoxys calcitrans* which fed on the inoculated Monkey No. 1 on 1st June were allowed to bite the *Stomoxys* Monkey No. 3. About a dozen had died, but the rest fed freely, probably most of them biting. In the afternoon about 50 more *Stomoxys* which had been starved for two days were fed on Monkey No. 1, and then within 15 minutes on Monkey No. 3.

3rd June.—The *Stomoxys*, of which 110 were counted, were fed first on Monkey No. 1 and then on Monkey No. 3. They fed freely on both.

4th June.—The *Stomoxys* still alive, about 90 in number, were fed for five minutes on Monkey No. 1 and then for ten minutes on Monkey No. 3. The latter monkey was evidently bitten severely, as it screamed several times.

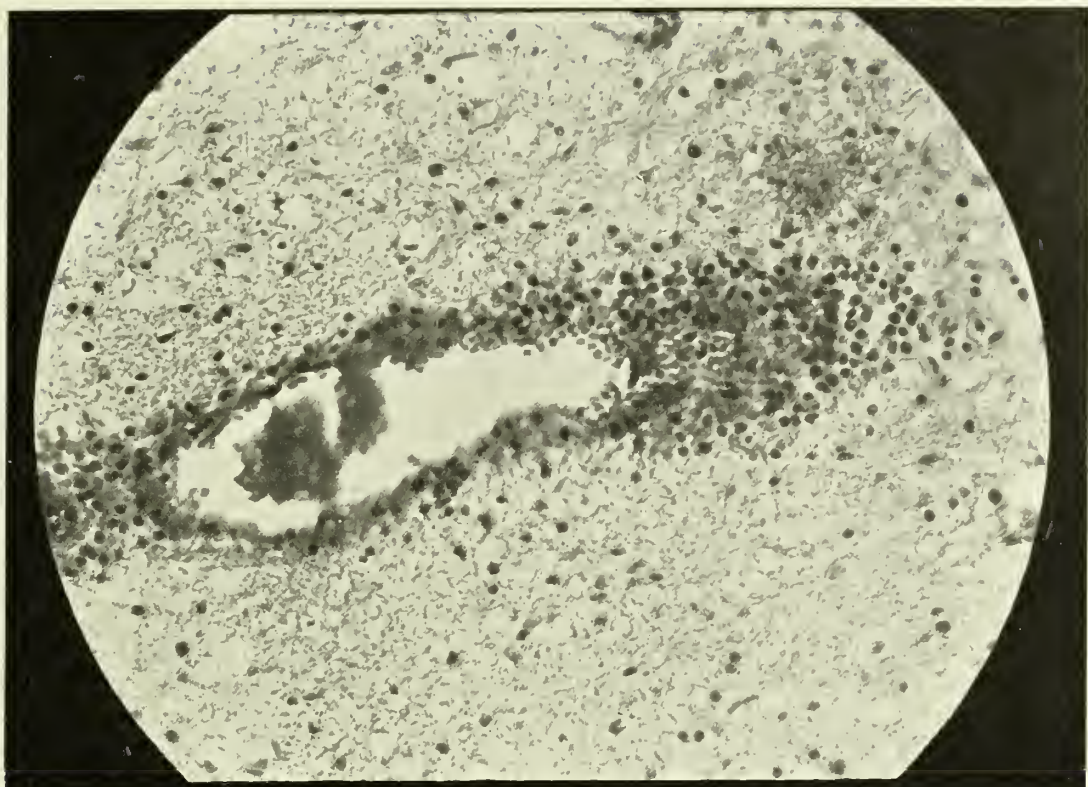


Figure I.—Human.

A blood vessel, surrounded by small round cells and red blood corpuscles.

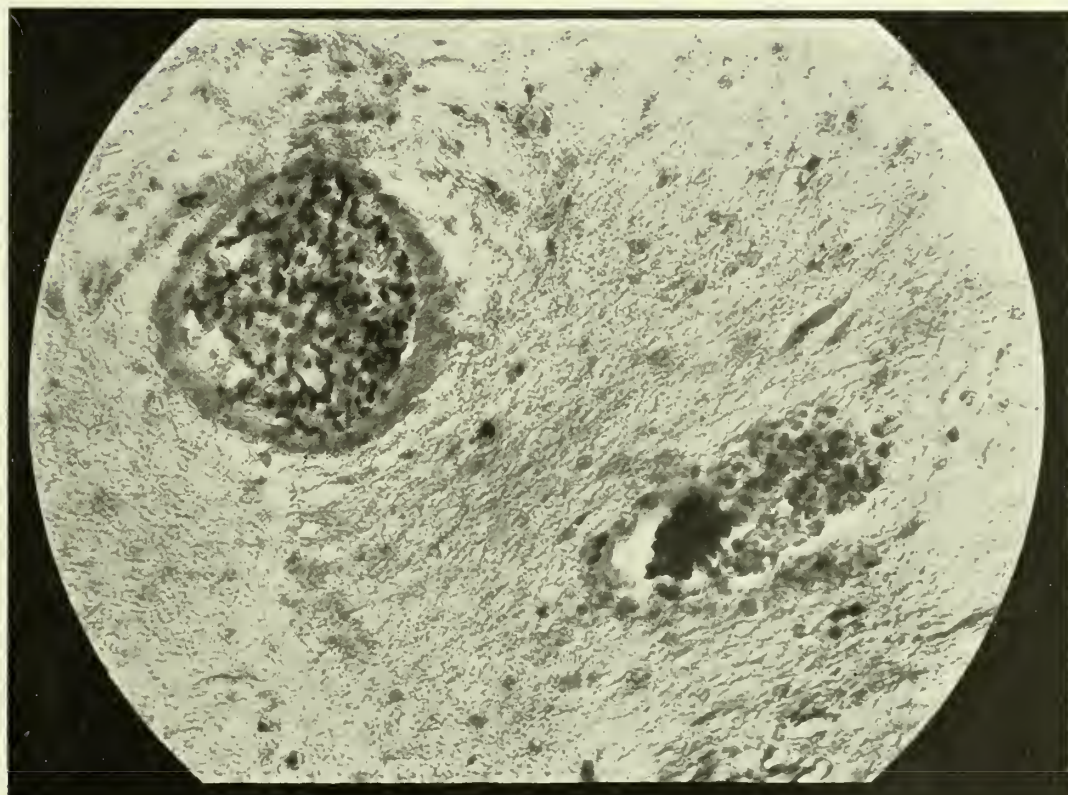


Figure II.—Monkey. Upper Cervical.

On the left is seen the choked central canal, on the right a choked blood vessel surrounded by small round cells.



Figure III. — Monkey. Lower Dorsal.
 Note the pallor of the anterior cornua indicating extensive necrosis.

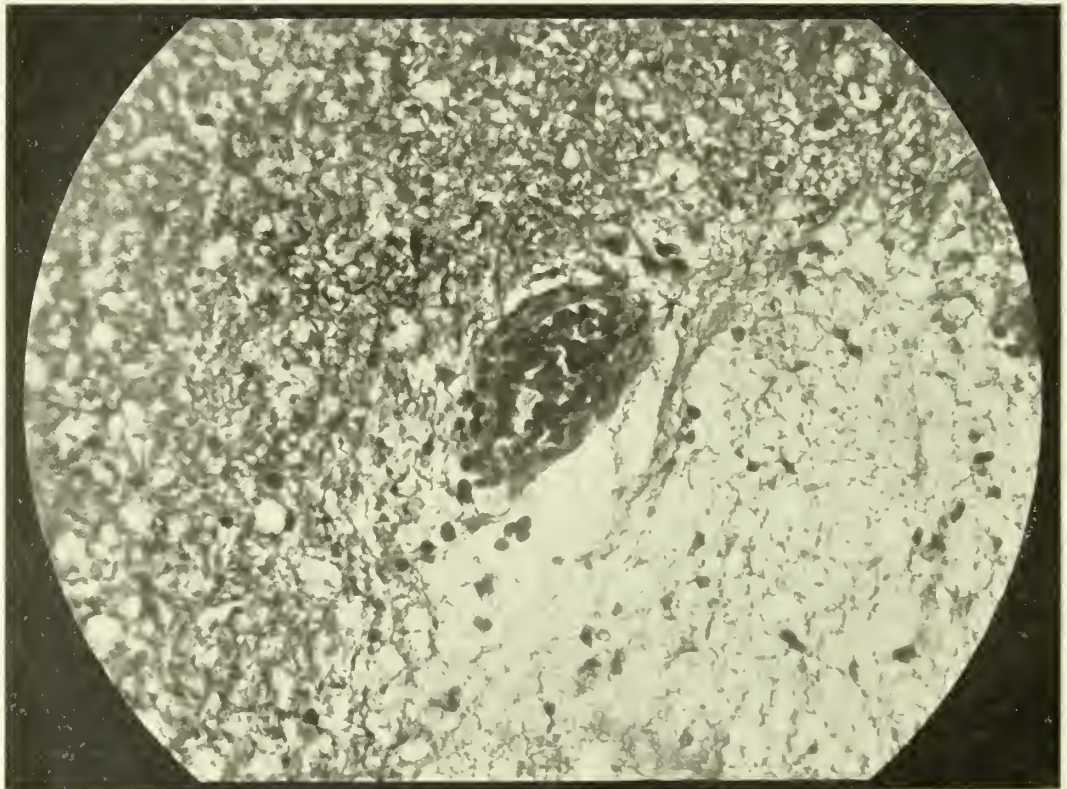


Figure IV. Monkey. Lower Dorsal.
 A blood vessel is shown at the junction between healthy (left upper) and necrotic (right lower) tissue.

5th June.—About 70 flies were fed on each of the monkeys.

6th June.—The flies were again fed on both the monkeys.

7th June.—The flies again fed on both monkeys.

8th June.—The flies still alive, about 70 in number, were fed on both monkeys.

The inoculated monkey was killed on this date.

9th and 10th June.—About 60 flies fed on the monkey.

12th June.—56 flies fed. His temperature, which from 5th to 10th June had been consistently 36°, was now 37·5°.

13th June.—35 flies fed. Temperature 38°.

14th June.—32 " " " 37°.

15th June.—28 " " " 38°.

16th June.—18 " " " 38°.

17th June.—4 " " " just over 38°.

19th June.—2 " " " 37°.

20th June.—All the flies were dead.

Throughout this period and thereafter the animal showed no evidence of illness or paresis whatsoever.

The question may be raised as to whether the withered arm of this monkey might have been due to a naturally contracted attack of Acute Poliomyelitis. The fact, however, that the arm was rigidly flexed and not flaccid would seem to exclude this.

ACUTE POLIOMYELITIS (HUMAN).

Microscopic Examination of the Spinal Cord.

Sections from the cervical, upper dorsal, middle dorsal, and lumbar levels, respectively, were examined.

The specimens were well-stained with iron-haematoxylin, and the various structural elements could be clearly recognised.

In all the specimens there was manifest and unequivocal evidence of those changes which characterise Acute Poliomyelitis (Heine-Medin Disease) in an acute stage. Thus the blood vessels wherever sought were engorged—this was the case even in the white substance; then where blood vessels are normally numerous, namely, in the grey substance (both anterior and posterior cornua), along the anterior median fissure, and in the white substance next the *processus lateralis* in the dorsal region, the vessels were not only engorged, but surrounded by a ring, often diffuse and extensive, of mononucleated small round cells (compound granular cells), scattered among which were epithelioid cells and red blood corpuscles. (Fig. I.) This infiltration with small round cells or interstitial inflammation was the dominant feature. The inflammatory foci and the resultant destruction therefrom were largest and greatest in the anterior cornua, and were best seen in a section from the cervical enlargement, where also the changes were bilateral. (Bilaterality of the affection applied to all the sections, but the changes were not symmetrical. Thus in the section marked lumbar—really upper lumbar—one anterior horn was much more affected than the other. In this specimen it was further interesting to note a small focus of destruction—almost necrosis—in one of the columns of Clarke.)

Concerning nerve cells, there was clear evidence in the section from the cervical enlargement (in the sections from other levels motor cells were not sufficiently numerous for observation) that they were affected. First, large deeply stained cells with Nissl bodies could be seen—these were apparently normal cells; secondly, more numerous cells which were pallid and swollen, and had excentric nuclei—these were in course of degeneration; and thirdly, the number of cells on the whole was small, making it appear that some had already been destroyed.

The pia investing the cord did not seem to be affected, and where anterior and posterior spinal arteries appeared external to the cord they seemed to be normal. So also were portions of the spinal roots.

The central canal was normal.

MONKEY.

Microscopic Examination of the Spinal Cord of the Successfully Infected Animal.

Sections were successfully stained with iron haematoxylin.

Upper cervical.—The specimen from the upper cervical region was approximately normal, but in the grey matter on one side, where anterior and posterior cornua joined, was a collection of three or four blood vessels, much engorged, and in the neighbourhood were faintly stained mononuclear small round cells and some extravasated red blood cells. This was not a striking focus. Some vessels could be seen whose perivascular spaces were choked with small round cells (there was one near the central canal). (Fig. II.) The central canal looked dilated and was blocked with what appeared to be a thrombus.

Lower cervical.—In one anterior cornu laterally placed was a distinct area or focus of small round cells which was certainly pathological. The central canal was normal or only distended. Neither here nor at any other level were there noteworthy changes in the investing pia-arachnoid, or extra-spinal vessels or nerve roots.

Lower dorsal.—A very interesting specimen.

Bilaterally in the anterior cornua, as represented (Figs. III and IV), were what seemed to be areas of necrosis or softening. The part was pale (it could be seen with the naked eye), and structurally composed of an open network of trabecular and persistent capillaries, with small round cells dotted about. By this the cornua were practically converted into shells and no nerve cells were visible. The cells surrounding the central canal were irregular and the epithelium was gone.

Dorsal.—In one anterior horn, laterally situated, was a small but unmistakable area occupied by small round cells, and near by was a congested vessel showing perivascular exudate.

Lumbar.—Unfortunately this specimen had been crushed in extraction of the cord, and though there appeared to be extensive changes in both anterior cornua, possibly they were artefacts.

Summarising the description, we found that in every section there were changes, and these were of an interstitial inflammatory nature. But the affection was patchy, most marked in the lower dorsal and perhaps in the lumbar region and least marked in the cervical region.

Compared with the human specimen, the changes were not so widely distributed, they were more confined to the anterior cornua; their destructive effects were more locally concentrated. Also it appeared that the changes in the monkey's cord were older, more advanced by several days than those in the human cord. But the morbid process in the two cords was essentially the same, an interstitial poliomyelitis; the irritating factor had almost certainly come along the blood vessels (it had been an intense and rapidly acting irritant, not a slow worker like the spirochæte of syphilis or the trypanosome of sleeping sickness), and the same factor might have produced the changes in the two cords.

(The changes closely resembled those seen in the posterior root ganglia in herpes zoster in the acute stage.)

Remarks.

A case is here shown in which the cause of death was doubtful until microscopic examination of the spinal cord, and an experiment on an animal, definitely proved it to be acute poliomyelitis.

Experimentally the human disease was reproduced in a Macaque monkey by intraperitoneal injection of unfiltered glycerinated spinal cord emulsion, but there was failure to transmit the disease when the emulsion was filtered and similarly used.

Concerning the successful experiment it was but a repetition of what has been found by many others; while the failure to transmit the disease with filtered emulsion, puzzling to us at first, is now readily to be explained. We have since learned, first from the experiments of Flexner and his school, that although infection has been produced by injection of the virus, filtered or unfiltered, into the peritoneum (also into the anterior chamber of the eye, the subcutaneous tissues, the spinal canal, veins and the sheath of nerves) the most certain method of producing infection is by injecting the virus into the brain. The reason for this is that within the nervous tissues the disease finds the most favourable conditions for operation. Secondly, although we knew from the experiments of Landsteiner and Levaditi, and others, that the virus would pass through porcelain filters and withstand glycerinisation, we were not aware that after such treatment, especially filtration, the virus lost strength, and thereby the incubation period of the disease was prolonged, or only a mild form of the disease was produced. From the foregoing it is easy to understand our failure with the filtered emulsion.

Concerning our attempt to infect by using *Stomoxys calcitrans* (the stable fly) as a carrier we would indicate that the experiment was cautiously conducted and thorough, inasmuch as steps to prevent contagion were taken by keeping the infected animal and the test animal widely apart in cages in different parts of the building, and by employing numerous flies and giving them abundant opportunities of feeding on both animals. The negative result is in accordance with recent experiments carried out at the Rockefeller Institute, and in accordance, moreover, with the belief that the infection in poliomyelitis is local and neural and by way of the lymphatics, not general by way of the blood stream. On this point we may mention that experiment has shown it to be difficult to infect a monkey with the blood of a patient suffering from acute poliomyelitis, a large quantity of blood being required. How much more difficult must it be for the *Stomoxys* to carry over a sufficiency of the virus. We would subscribe, therefore, to the belief that epidemic poliomyelitis is not spread by means of the stable fly.

Lastly, concerning the histological findings in both this human and this experimental case, although they depart in no important respect from what has been described by others as characteristic of the disease in an acute stage, they have confirmatory value in showing that distended blood vessels, perivascular hæmorrhages and perivascular lymphocytic infiltrative exudations are the dominant histological features, and that in the nervous system the process follows the blood vessels and the resultant destruction of tissues is the outcome of vessel obliteration and perivascular hæmorrhage, exudation and œdema.

APPENDIX.

NOTES ON *STOMOXYS CALCITRANS*.

(J. B. CLELAND.)

In infantile paralysis investigators have suggested from time to time that perhaps the common biting fly, *Stomoxys calcitrans*, might be the instrument of transmission from case to case of the disease in human beings, or from an animal reservoir to human beings. Experiments have in fact been conducted which seem to show that it is possible for this fly to convey the disease from one monkey to another when taken directly from a sick monkey to a healthy one.

Stomoxys calcitrans is an exceedingly common biting fly probably met with throughout Australia as in most other parts of the world. One of us has met with it abundantly in Sydney, Melbourne, Adelaide, and Perth, and has frequently found it in many country towns in New South Wales whenever looked for. The fly in general appearance resembles the common house fly. Closer observation, however, at once shows that the insect when it rests does not assume quite the same position as the house fly, that its abdomen is rounder, and that it carries in front a very definite piercing proboscis, in fact, a bayonet slung under the mouth parts. The fly may be found in abundance resting after engorgement on sunny walls in many parts of our large cities, especially in the neighbourhood of stables and on the outbuildings of dairies. How abundant it is in some parts of Sydney may be illustrated by the fact that in the neighbourhood of the Glebe Island Abattoirs a thousand flies can frequently be captured in the course of two hours. The bite of *Stomoxys calcitrans* is very painful when the fly is allowed to insert fully its proboscis. Fortunately for man its favourite food hosts are horses and cows. Where these food hosts can be easily found *Stomoxys* usually confines its attention to them, but when hungry it will at once attack human beings. Thus a number of flies captured one morning and liberated in a fly-proof cage in which a calf was confined had become ravenous, and as soon as they were released, at once settled on and bit the calf in large numbers, but some were so eager for a meal, that coming in contact with the legs or hands of the person liberating them, they at once tried to obtain food from this source. Not infrequently in gardens in Sydney and in country districts an odd *Stomoxys* will make an effort to draw blood from human beings. The insertion of the proboscis is at once felt and the fly is driven away, the individual attacked usually considering that for some reason the common domestic fly has stung him. The odd flies thus feeding are probably the individuals which have failed to secure food from their ordinary hosts, cattle and horses, and so being hungry have attacked the first vertebrate met with. With the superseding of horses by motor traction the food for *Stomoxys* will probably be diminished in amount, and so these insects may become more aggressive as regards human beings; though on the other hand the diminution in the number of horses will mean that there are fewer breeding places in the shape of horse dung to provide for further generations of flies. Both cattle and horses when noticed at rest will be seen to have their tails continually in motion with the object of driving away flies; in the horse this is further aided by the movements of the skin muscles. The flies from which these animals are thus protecting themselves are not, as many people suppose, ordinary house flies which merely tickle them, but *Stomoxys calcitrans* which are making frequent efforts to pierce their skin and draw blood. It is this fly which makes the butcher's and baker's horse so restive whilst waiting to proceed again on the rounds. The flies specially select the lower part of the legs of animals to feed on, and in this situation perhaps twenty or thirty or more flies may be seen on a single cow or horse engorging themselves with blood.

The stable fly has been suggested as a possible vector of the organisms of several diseases. Infantile paralysis is one of these. In addition to infantile paralysis it has been suspected of transmitting that very dangerous horse disease, Surra, though perhaps acting more as a mechanical transmitter than as the intermediate host of the trypanosome responsible. In America it has been suggested that the organism of pellagra, if there is such an organism, may be transmitted by *Stomoxys calcitrans*. In Australia we suspected this insect of being the intermediate host of *Onchocerca gibsoni* which produces worm nests in cattle, but have come to the conclusion that it is not the intermediate host sought for.

As infantile paralysis has recently occurred prominently amongst us, it may be well to review shortly its possible rôle in transmitting this disease. It has already been indicated that *Stomoxys calcitrans* comparatively rarely bites human beings; still rarer must be the likelihood of one of these flies biting one human being, and then within a few hours or within a few days biting another human being. Very much rarer, indeed, must be the likelihood of its biting an individual harbouring the organism of infantile paralysis or an actual case of this disease and then biting another human being, preferably a child, under circumstances which would allow the transmission of the virus to the second individual. It does not, therefore, seem very likely that the stable fly, *Stomoxys calcitrans*, can be the vector of infantile paralysis from one human case or from one human "carrier" directly to another. It is quite possible, however, that in some of our domestic animals there may exist a reservoir for the virus of infantile paralysis. As is well known, from time to time epidemics of illness are said to have occurred in horses at the same time as epidemics of infantile paralysis have occurred in human beings. It is further quite possible that the virus of infantile paralysis may occur frequently in one of our domestic animals, may multiply abundantly in such animal, and yet may not be capable

capable of doing any material damage to the animal affected. That this view is not fantastic is supported by what appears to be clear evidence that many children associated with cases of infantile paralysis have developed protective bodies in their blood and yet have not suffered from any symptoms of the disease. In fact it would almost seem as if human infection with the virus as a rule led to no damage to the individual in question, and that it was only a case here and there that developed definite evidence of the disease. As *Stomoxys calcitrans* feeds so extensively upon horses it would, therefore, be quite easy for it, if the horse is from time to time a reservoir of the virus, to transmit such virus from the equine reservoir to a human being with or without the virus undergoing a further phase of development in the conveyor, the *Stomoxys*. It would be very interesting to make searching inquiries as far as possible into all cases of infantile paralysis in Australia, to ascertain whether the victim had recently been bitten by *Stomoxys calcitrans*; to find out the prevalence of this fly in the neighbourhood of such cases; and to obtain any evidence of coincident disease in horses or other domestic animals.

8. VACCINES.

(J. B. CLELAND and B. BRADLEY.)

The present list of vaccines prepared will comprise the seventh tabular statement in connection with the preparation of such vaccines since the establishment of the Bureau of Microbiology in 1909. These seven series added together should show reasonably well the value of vaccines as applied to various infective conditions. The number of cases reviewed is considerable, and where the series of any particular complaint is large, the results obtained are not likely to vary to any marked extent in further series of similar cases. Owing to the labour involved in preparation, it is doubtful whether in future annual reports these tabular statements will be continued.

During the year under review a large number of vaccines have been prepared and issued. The reported results have again emphasised the opinion expressed in our previous reports that in any disease due to or aggravated by bacterial organisms the administration of a vaccine is well worth trying, especially when other measures fail or are not completely successful.

Acne, Boils, and other Skin Conditions.—In acne conditions the reported results with *Staphylococcus albus* show occasional cures, but more often only improvement. Pyogenic infections, such as boils, due to *Staphylococcus aureus* have, as usual, given very good results under vaccine treatment. A syphilitic impetigo, in which the patient was a mass of sores, cleared up completely under a streptococcal vaccine combined with anti-syphilitic treatment.

Pyæmia.—A case diagnosed as pyæmia, in which the *Bacillus pyocyaneus* was obtained, showed considerable improvement, which was considered as due to the vaccine.

Infections of the Urinary Tract.—Nearly seventy specimens of urine were submitted and vaccines prepared from the organisms found present. In the great majority of the cases coliform bacilli were found. Most of the cases reported on were considered as cured or improved.

Infections of the Uterus and Adnexa.—In a case of pyæmic abscesses after septic abortion, *B. pyocyaneus* was isolated and a vaccine of this used. Dr. Ritchie reported that the patient improved more rapidly after vaccine treatment was begun.

Respiratory System.—In chronic bronchitis and bronchiectasis good results seem to follow the use of mixed vaccines from the sputum. It is hard to say how far these vaccines are specific and how far the improvement is due to the subcutaneous injection of bacterial protoplasm which, acting merely as a foreign proteid, may perhaps exert an "alterative" effect upon the body cells and processes. In mixed infections complicating pulmonary tuberculosis some improvement has resulted also from the use of mixed vaccines from organisms isolated from the sputum.

Anti-typhoid Vaccine.—During 1916 the preparation of anti-typhoid vaccine for military purposes was continued. In this connection 211,808 c.c. were forwarded, whilst in addition 3,641 c.c. were supplied to civilian medical practitioners, &c. The standardisation was 1,000,000 per c.c.

ACNE, Furunculosis, and Infective Conditions of the Skin and Subcutaneous Tissues.

No.	Disease.	Specimen.	Organism found.	Organism from which vaccine was prepared.	Reporter.	Course, Dosage, &c.	Result.	Notes.
16/1830	Acne	Cultures from eruption on face.	<i>Staphylococcus albus</i>	<i>S. albus</i>	Dr. W. McDonagh	Course, eleven weeks. 500 mill. at intervals of one week.	Improved	Other treatment—Steaming time, iod. locally. Synchronous with vaccine.
16/1901	Acne vulgaris	Pus	<i>Staphylococcus albus</i>	<i>S. albus</i>	Dr. Hilton Smith	Course, six weeks. 500 mill. per week	Satisfactory	Ung. sulphuris, 50 per cent., rubbed in after steaming face.
16/1791	Acne	Pus	<i>Staphylococcus albus</i>	<i>S. albus</i>	Australian Garrison Hospital.	No particulars available. Patient on Active Service.	.....
16/1817	Acne	Pus	<i>Staphylococcus albus</i>	<i>S. albus</i>	Australian Garrison Hospital.	No particulars available. Patient on Active Service.	.....
16/1892	Acne vulgaris, with much facial disfigurement.	Pus	<i>Staphylococcus albus</i>	<i>S. albus</i>	Coast Hospital.	Course, eight weeks. 125 mill. increased by 100 mill. every four days till dose was 500 mill., at which strength it was maintained.	Cured	Other treatment—Sulphur soaps, iodine paints, and dusting powders, &c.
16/2497	Acne	Pus	<i>Staphylococcus albus</i>	<i>S. albus</i>	Dr. Chapple	Course, ten weeks. 500 mill. in weekly doses.	Much improved	Steaming face and time, iod. locally, synchronous with vaccine.
16/3690	Acne	Pus	<i>Staphylococcus albus</i>	<i>S. albus</i>	Dr. W. McDonagh	.....	.....
16/4145	Acne	Pus	<i>Staphylococcus albus</i>	<i>S. albus</i>	Dr. Pirie	Course, about three weeks. Three injections, 300 mill., 600 mill., and 750 mill.	Improved	Mercurial soap.
16/4231	Acne vulgaris	Pus	<i>Staphylococcus albus</i>	<i>S. albus</i>	Dr. W. Cross	Course, one month. Six doses of 100 mill. to 300 mill.	Treatment was not completed. Patient was called away on Active Service.	
16/4240	Acne vulgaris	Pus	<i>Staphylococcus albus</i>	<i>S. albus</i>	Coast Hospital.	Course, three and a half weeks. 250 mill. to 1,200 mill. Six injections.	Improved	Face washed with mercurial soap, also pumice soap. Ung. hyd. amm. applied daily.
16/4846	Acne vulgaris	Pus	<i>Staphylococcus albus</i>	<i>S. albus</i>	Dr. W. Cross	Course, three months. 85 mill. up to 320 mill. every five days.	Slight improvement	Sulphur lotions, &c.
16/4939	Acne	Pus	<i>Staphylococcus albus</i>	<i>S. albus</i>	Dr. A. G. Cooley	Particulars unavailable. Patient on Active Service.	.....
16/4948	Acne	Pus	"Yeast" and <i>Staphylococcus albus</i> , later <i>S. albus</i> only.	<i>S. albus</i>	Major Kerr	Course, nine weeks. Initial dose 50 mill. given at intervals of five days, and increased by 50 mill. up to 250 mill., which dose was maintained.	Improvement	
16/5248	Acne vulgaris, with abscess formations.	Pus (agar culture)	<i>Staphylococcus albus</i>	<i>S. albus</i>	Dr. Tivey	Course, five weeks. 500 mill. at intervals of a week.	Cured	Steaming, &c.
16/5434	Acne	Pus	<i>Staphylococcus albus</i>	<i>S. albus</i>	Dr. McDonagh	Course, five weeks. 500 mill. at intervals of a week.	Improved	
16/5521	Acne	Pus	<i>Staphylococcus albus</i>	<i>S. albus</i>	Dr. McDonagh	Course, one month. Weekly injections of 500 mill.	Successful	
16/5715	Acne	Pus	<i>Staphylococcus albus</i>	<i>S. albus</i>	Dr. Rogers	Course, fourteen days. Three injections, 60 mill., 100 mill., 130 mill.	Cured	Treatment would have been pursued, but patient went on leave.
16/1346	Acne (pustular)	Pus	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Medical Officer, H.M.A.S. "Fingra."	Particulars unavailable. Patient on Active Service.	.....
16/6209	Acne vulgaris	Pus	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Captain Maher	Particulars unavailable. Patient on Active Service.	.....
16/3612	Acne	Pus	No growth.	Stock mixed acne bacillus and <i>S. albus</i> .	Dr. Mills	Course, two months. Initial dose, 200 mill. As patient got some fresh lesions, next dose was given eight days later—100 mill. This was given for two more injections at weekly intervals, after which the dose was 200, 300, 400, 500 mill. at weekly intervals. Two injections of 500 mill. were given.	Cured	Incision of abscess when necessary, foment, &c.
16/6309	Acne	Pus	No growth.	Stock mixed acne bacillus.	Armidale Hospital	Course, one month, 50 mill., gradually increased to 250 mill. at weekly intervals.	.....	The case seemed favourably influenced by vaccine. Patient has had no fresh boils for some weeks.
16/6386	Acne	Pus	Colon bacilli.	Colon bacilli.	Major Kerr	Particulars unavailable. Patient on Active Service.	.....
16/5210	Acne	Pus	Coliform	Coliform	Garrison Hospital	Particulars unavailable. Patient on Active Service.	.....
16/1470	Furunculosis	Pus from boil	<i>Staphylococcus albus</i>	<i>S. albus</i>	Dr. E. A. Tivey	Course, three weeks. Four injections of 500 mill.	Cured	Time, ferril arsenicals, ung. sulphuris.
16/3017	Furunculosis of forearm	Pus (agar culture)	<i>Staphylococcus albus</i>	<i>S. albus</i>	Coast Hospital	.....	.....
16/4931	Furunculosis	Pus culture from arm	<i>Staphylococcus albus</i>	<i>S. albus</i>	Coast Hospital	.....	.....
16/4959	Furunculosis	Broth culture	<i>Staphylococcus albus</i>	<i>S. albus</i>	Dr. Brodowski	.....	.....
16/6511	Furunculosis	Material from pustule on back.	<i>Staphylococcus albus</i>	<i>S. albus</i>	Coast Hospital	.....	.....

ACNE, Furunculosis, and Infective Conditions of the Skin and Subcutaneous Tissues—continued.

No.	Disease.	Specimen.	Organism found.	Organism from which vaccine was prepared.	Reporter.	Course, Dosage, &c.	Result.	Notes.
16/480	Furunculosis	Pus from boil	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Dr. Johnston Binns	.....	.....	.....
16/715	Furunculosis	Pus from boil	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Dr. Weedon	.....	.....	.....
16/936	Furunculosis of neck	Agar culture	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Coast Hospital	Treatment was not continued after two injections of 100 mill. and 200 mill., as patient did not return.	.....	.....
16/1177	Furunculosis	Pus	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Field Hospital, Liverpool.	Particulars unavailable; patient on active service.	.....	.....
16/1655	Furunculosis	Pus	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Dr. A. G. Cooley	Course, six weeks. 175 mill. every five days	Cured	Condition cleared up. Other
16/1659	Furunculosis of face	Culture from pustule.	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Coast Hospital	Course, eight weeks. Initial dose, 75 mill. gradually increased by 50 mill. every seven days till final dose was 300 mill.	Cured	treatment—General blood tonic, e.g., iron, quinine, arsenic.
16/1836	Furunculosis of neck, &c.	Pus	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Dr. Guthrie Hunter	Course, six weeks. Ten injections at intervals of five days, ranging from 50 mill. to 500 mill., then decreased to 400, and finally 300 mill.	Complete recovery	surgical treatment to the boil during the first week or so of the course. No other treatment. The condition had been present for about three months previously, and appears to have resisted ordinary treatment.
16/2434	Furunculosis of arms and legs	Culture of pus	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Coast Hospital	Course, twelve days. 200 mill., increased by 200 mill. every four days for four doses.	Cured	General tonic treatment. Opening some of the boils.
16/2697	Furunculosis	Pus	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Dr. R. Arthur	.....	.....	Tonics. Pustules used to form on body, neck and arms. Under vaccine influence the pustules seldom seemed to come to a head, and later none seemed to come to a head. In the last fortnight none showed any where, and patient discontinued treatment.
16/2731	Furunculosis of neck	Culture from boil	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Dr. Bradley	Course, two months. Nine injections at intervals of one week, ranging from 100 mill. to 350 mill.	Cured	.....
16/2751	Furunculosis of neck, &c.	.....	.....	.....	Coast Hospital	.....	.....	.....
16/2943	Furunculosis	Pus from boil	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Dr. W. D. Laughton	Course, one month. 250 mill., increased gradually to 500 mill. Intervals of four days.	Much improved. Cured?	.....
16/3808	Furunculosis	Culture from boil	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Dr. E. A. Tivey	Course, two months. Initial dose 100 mill. increased after three injections to 200 mill. Weekly injections.	Cured	Calcium sulphide and Ung. hyd. amm. Developed a metastatic abscess in the loin, a so-called perinephritic abscess.
16/3273	Furunculosis	Culture of pus from boil	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Capt. Bateman, A.A.M.C.	Particulars unavailable. Patient on active service.	.....	.....
16/3530	Furunculosis	Pus	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	St. George's Cottage Hospital.	.....	.....	.....
16/3722	Furunculosis	Pus	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Dr. Wherrett	.....	.....	No other treatment. One small boil appeared after first dose, none since. At commencement of treatment patient had seven boils. During last six months has had over 100 boils.
16/4749	Furunculosis (callosities)	Pus	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Dr. R. M. Crookston	Course, five weeks. Initial dose, 125 mill. Final dose, 450 mill. Four injections.	Cured	No other treatment. No boils have appeared since beginning of treatment. Previously was cured without one or more. Case of many months duration.
16/1838	Furunculosis (callosities)	Pus	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Dr. R. M. Crookston	Course, five weeks. Eight injections, ranging from 200 mill. to 700 mill.	Cured	Freedom from boils for one month in this case is so unusual that it can safely be ascribed to result of vaccine.
16/3054	Furunculosis of face	Pus	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Coast Hospital	Course, one month. Five injections, ranging from 100 mill. to 750 mill.	Cured	.....
16/1091	Furunculosis	Pus	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Coast Hospital	Course, two months. Four injections, ranging from 250 mill. to 350 mill.	Cured	.....

ACNE, Furunculosis, and Infective Conditions of the Skin and Subcutaneous Tissues—continued.

No.	Disease.	Specimen.	Organism found.	Organism from which vaccine was prepared.	Reporter.	Course, Dosage, &c.	Result.	Notes.
16/4016	Furunculosis (chronic).....	Pus	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Dr. R. M. Crookston	Course, three weeks. Increasing from initial dose of 100 mill. to maximum dose of 500 mill. at varying intervals of from three days to a week. 150 mill. every five days. Reporter on Active Service. Particulars unavailable. 150-500 mill. at intervals of one week. Service. Particulars unavailable. Patient on Active Service. Still under treatment. 100 mill. increased to 500 mill. at five days' interval. Five injections. Course, six weeks. Seven injections of 250 mill.	Cured	Other treatment—Nil, except for dyspepsia. Rapid disappearance of boils.
16/4090	Furunculosis	Pus	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Dr. A. G. Cooley	Course, six weeks. 150 mill. every five days. Reporter on Active Service. Particulars unavailable. 150-500 mill. at intervals of one week. Service. Particulars unavailable. Patient on Active Service. Still under treatment. 100 mill. increased to 500 mill. at five days' interval. Five injections. Course, six weeks. Seven injections of 250 mill.	Cured	No other treatment. Boils disappeared.
16/4731	Furunculosis	Pus	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Dr. E. D. Clarke	Course, six weeks. 150 mill. every five days. Reporter on Active Service. Particulars unavailable. 150-500 mill. at intervals of one week. Service. Particulars unavailable. Patient on Active Service. Still under treatment. 100 mill. increased to 500 mill. at five days' interval. Five injections. Course, six weeks. Seven injections of 250 mill.	Cured	Local treatment—Antiseptic dressings and incisions.
16/5133	Furunculosis	Pus	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Dr. P. L. Hipsley	Course, six weeks. 150 mill. every five days. Reporter on Active Service. Particulars unavailable. 150-500 mill. at intervals of one week. Service. Particulars unavailable. Patient on Active Service. Still under treatment. 100 mill. increased to 500 mill. at five days' interval. Five injections. Course, six weeks. Seven injections of 250 mill.	Cured	
16/5170	Furunculosis	Pus	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Dr. C. R. Hodgson, Dr. A. J. Chapman.	Course, six weeks. 150 mill. every five days. Reporter on Active Service. Particulars unavailable. 150-500 mill. at intervals of one week. Service. Particulars unavailable. Patient on Active Service. Still under treatment. 100 mill. increased to 500 mill. at five days' interval. Five injections. Course, six weeks. Seven injections of 250 mill.	Cured	
16/7011	Furunculosis (thirteen months' duration).....	Pus	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Coast Hospital	Course, six weeks. 150 mill. every five days. Reporter on Active Service. Particulars unavailable. 150-500 mill. at intervals of one week. Service. Particulars unavailable. Patient on Active Service. Still under treatment. 100 mill. increased to 500 mill. at five days' interval. Five injections. Course, six weeks. Seven injections of 250 mill.	Cured	
16/5617	Furunculosis	Culture from boil	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Coast Hospital	Course, six weeks. 150 mill. every five days. Reporter on Active Service. Particulars unavailable. 150-500 mill. at intervals of one week. Service. Particulars unavailable. Patient on Active Service. Still under treatment. 100 mill. increased to 500 mill. at five days' interval. Five injections. Course, six weeks. Seven injections of 250 mill.	Cured	
16/6120	Furunculosis	Swab and serum culture.	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Armidale Hospital	Course, six weeks. 150 mill. every five days. Reporter on Active Service. Particulars unavailable. 150-500 mill. at intervals of one week. Service. Particulars unavailable. Patient on Active Service. Still under treatment. 100 mill. increased to 500 mill. at five days' interval. Five injections. Course, six weeks. Seven injections of 250 mill.	Cured	
16/6627	Furunculosis	Pus	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Dr. Johnston Bluns	Course, six weeks. 150 mill. every five days. Reporter on Active Service. Particulars unavailable. 150-500 mill. at intervals of one week. Service. Particulars unavailable. Patient on Active Service. Still under treatment. 100 mill. increased to 500 mill. at five days' interval. Five injections. Course, six weeks. Seven injections of 250 mill.	Cured	
16/6960	Furunculosis	Agar culture	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Dr. F. A. Tvey	Course, six weeks. 150 mill. every five days. Reporter on Active Service. Particulars unavailable. 150-500 mill. at intervals of one week. Service. Particulars unavailable. Patient on Active Service. Still under treatment. 100 mill. increased to 500 mill. at five days' interval. Five injections. Course, six weeks. Seven injections of 250 mill.	Cured	
16/5365	Furunculosis	Pus from finger	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Dr. Muller	Course, six weeks. 150 mill. every five days. Reporter on Active Service. Particulars unavailable. 150-500 mill. at intervals of one week. Service. Particulars unavailable. Patient on Active Service. Still under treatment. 100 mill. increased to 500 mill. at five days' interval. Five injections. Course, six weeks. Seven injections of 250 mill.	Cured	
16/4308	Carbuncle	Pus from carbuncle	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Dr. Graham	Course, six weeks. 150 mill. every five days. Reporter on Active Service. Particulars unavailable. 150-500 mill. at intervals of one week. Service. Particulars unavailable. Patient on Active Service. Still under treatment. 100 mill. increased to 500 mill. at five days' interval. Five injections. Course, six weeks. Seven injections of 250 mill.	Cured	
16/3963	Carbuncle	Pus	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Dr. O'Keefe	Course, six weeks. 150 mill. every five days. Reporter on Active Service. Particulars unavailable. 150-500 mill. at intervals of one week. Service. Particulars unavailable. Patient on Active Service. Still under treatment. 100 mill. increased to 500 mill. at five days' interval. Five injections. Course, six weeks. Seven injections of 250 mill.	Cured	
16/1256	Carbuncle	Pus	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Dr. Young	Course, six weeks. 150 mill. every five days. Reporter on Active Service. Particulars unavailable. 150-500 mill. at intervals of one week. Service. Particulars unavailable. Patient on Active Service. Still under treatment. 100 mill. increased to 500 mill. at five days' interval. Five injections. Course, six weeks. Seven injections of 250 mill.	Cured	Hot carbolie fomentations, &c. Result was very satisfactory.
16/4296	Carbuncle of neck.....	Pus	<i>Coliform bacilli</i>	<i>Coliform bacilli</i>	Dr. W. J. White, St. George's Cottage Hospital, Rozarrah.	Course, six weeks. 150 mill. every five days. Reporter on Active Service. Particulars unavailable. 150-500 mill. at intervals of one week. Service. Particulars unavailable. Patient on Active Service. Still under treatment. 100 mill. increased to 500 mill. at five days' interval. Five injections. Course, six weeks. Seven injections of 250 mill.	Cured	Fomentations.
16/3871	Furunculosis of ext. aud.	Pus from ear	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Coast Hospital	Course, six weeks. 150 mill. every five days. Reporter on Active Service. Particulars unavailable. 150-500 mill. at intervals of one week. Service. Particulars unavailable. Patient on Active Service. Still under treatment. 100 mill. increased to 500 mill. at five days' interval. Five injections. Course, six weeks. Seven injections of 250 mill.	Cured	
16/1838	Abscesses of forearm	Pus from abscess	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Capt. G. L. Kerr, A.A.M.C.	Course, six weeks. 150 mill. every five days. Reporter on Active Service. Particulars unavailable. 150-500 mill. at intervals of one week. Service. Particulars unavailable. Patient on Active Service. Still under treatment. 100 mill. increased to 500 mill. at five days' interval. Five injections. Course, six weeks. Seven injections of 250 mill.	Cured	
16/4096	Chronic abscess	Pus	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Dr. McDonagh	Course, six weeks. 150 mill. every five days. Reporter on Active Service. Particulars unavailable. 150-500 mill. at intervals of one week. Service. Particulars unavailable. Patient on Active Service. Still under treatment. 100 mill. increased to 500 mill. at five days' interval. Five injections. Course, six weeks. Seven injections of 250 mill.	Cured	
16/5344	Abscess of face.....	Pus from boils	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Dr. J. Campbell	Course, six weeks. 150 mill. every five days. Reporter on Active Service. Particulars unavailable. 150-500 mill. at intervals of one week. Service. Particulars unavailable. Patient on Active Service. Still under treatment. 100 mill. increased to 500 mill. at five days' interval. Five injections. Course, six weeks. Seven injections of 250 mill.	Cured	
16/7750	.....	Swabbing from abscess	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Dr. Chas. Reid	Course, six weeks. 150 mill. every five days. Reporter on Active Service. Particulars unavailable. 150-500 mill. at intervals of one week. Service. Particulars unavailable. Patient on Active Service. Still under treatment. 100 mill. increased to 500 mill. at five days' interval. Five injections. Course, six weeks. Seven injections of 250 mill.	Cured	
16/3666	.....	Pus from abscess on neck.	<i>Coliform</i>	<i>Coliform</i>	Balmain Hospital	Course, six weeks. 150 mill. every five days. Reporter on Active Service. Particulars unavailable. 150-500 mill. at intervals of one week. Service. Particulars unavailable. Patient on Active Service. Still under treatment. 100 mill. increased to 500 mill. at five days' interval. Five injections. Course, six weeks. Seven injections of 250 mill.	Cured	
16/6212	Abscess associated with osteo-myelitis following on typhoid fever.	Pus from abscess	<i>Diphtheroid</i>	<i>Diphtheroid</i>	Rookwood State Hospital and Asylum.	Course, six weeks. 150 mill. every five days. Reporter on Active Service. Particulars unavailable. 150-500 mill. at intervals of one week. Service. Particulars unavailable. Patient on Active Service. Still under treatment. 100 mill. increased to 500 mill. at five days' interval. Five injections. Course, six weeks. Seven injections of 250 mill.	Cured	Toules and liberal diet. Plenty of fresh air (balcony bed), and exposure to sunlight. General condition much improved.
16/1611	.....	Pus	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Capt. Sanson, A.A.M.C.	Course, six weeks. 150 mill. every five days. Reporter on Active Service. Particulars unavailable. 150-500 mill. at intervals of one week. Service. Particulars unavailable. Patient on Active Service. Still under treatment. 100 mill. increased to 500 mill. at five days' interval. Five injections. Course, six weeks. Seven injections of 250 mill.	Cured	
16/879	.....	Pus	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Dr. Kane	Course, six weeks. 150 mill. every five days. Reporter on Active Service. Particulars unavailable. 150-500 mill. at intervals of one week. Service. Particulars unavailable. Patient on Active Service. Still under treatment. 100 mill. increased to 500 mill. at five days' interval. Five injections. Course, six weeks. Seven injections of 250 mill.	Cured	
16/5354	.....	Pus	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Dr. Chaplin	Course, six weeks. 150 mill. every five days. Reporter on Active Service. Particulars unavailable. 150-500 mill. at intervals of one week. Service. Particulars unavailable. Patient on Active Service. Still under treatment. 100 mill. increased to 500 mill. at five days' interval. Five injections. Course, six weeks. Seven injections of 250 mill.	Cured	
16/1092	.....	Pus from leg.....	Gram positive coccus and gram negative coliform bacillus.	Mixed vaccine	Balmain Hospital	Course, six weeks. 150 mill. every five days. Reporter on Active Service. Particulars unavailable. 150-500 mill. at intervals of one week. Service. Particulars unavailable. Patient on Active Service. Still under treatment. 100 mill. increased to 500 mill. at five days' interval. Five injections. Course, six weeks. Seven injections of 250 mill.	Cured	
16/6642	.....	Pus from arm	<i>B. proteus</i> and <i>staphylococcus</i>	Mixed	Maitland Hospital	Course, six weeks. 150 mill. every five days. Reporter on Active Service. Particulars unavailable. 150-500 mill. at intervals of one week. Service. Particulars unavailable. Patient on Active Service. Still under treatment. 100 mill. increased to 500 mill. at five days' interval. Five injections. Course, six weeks. Seven injections of 250 mill.	Cured	Fomentations to abscess. The vaccine had a very favourable result, and greatly accelerated the healing. Other treatment—equisol Laths twice daily—and cyanide gauze dressings at other times. Bier's hyperemia.
16/734	Cellulitis	Pus from arm	<i>Streptococci</i> and <i>S. albus</i> and <i>S. aureus</i>	<i>Streptococci</i>	Capt. Kerr, A.A.M.C.	Course, six weeks. 150 mill. every five days. Reporter on Active Service. Particulars unavailable. 150-500 mill. at intervals of one week. Service. Particulars unavailable. Patient on Active Service. Still under treatment. 100 mill. increased to 500 mill. at five days' interval. Five injections. Course, six weeks. Seven injections of 250 mill.	Cured	
16/1549	Cellulitis and lymphangitis of finger.	Smear on agar from finger.	<i>Streptococcus</i>	<i>Streptococcus</i>	Coast Hospital	Course, six weeks. 150 mill. every five days. Reporter on Active Service. Particulars unavailable. 150-500 mill. at intervals of one week. Service. Particulars unavailable. Patient on Active Service. Still under treatment. 100 mill. increased to 500 mill. at five days' interval. Five injections. Course, six weeks. Seven injections of 250 mill.	Cured	
16/4291	Cellulitis of arm	Pus from forearm	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Dr. C. Menzies	Course, six weeks. 150 mill. every five days. Reporter on Active Service. Particulars unavailable. 150-500 mill. at intervals of one week. Service. Particulars unavailable. Patient on Active Service. Still under treatment. 100 mill. increased to 500 mill. at five days' interval. Five injections. Course, six weeks. Seven injections of 250 mill.	Cured	Free drainage.

ACNE, Furunculosis, and Infective Conditions of the Skin and Subcutaneous Tissues—continued.

No.	Disease.	Specimen.	Organism found.	Organism from which vaccine was prepared.	Reporter.	Course, Dosage, &c.	Result.	Notes.
16/5136	Cellulitis of hand	Serum culture from hand.	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Dr. W. Ritchie	Course, about five weeks. 250 mill. initial dose and 500 mill. subsequent doses every four days. About eight doses.	Improved	Incision, antiseptic baths, hypertonic saline solution, and now mercury perchloride and glycine.
16/1304	Poisoned thumb	Discharge from thumb	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Dr. A. G. Cooley	Course, six weeks. 150 mill. every five days	Cured	
16/1943	Contusion of left thigh with effusion of blood beneath superficial muscles.	Pus	<i>Staphylococcus aureus</i> and streptococcus.	(1) <i>S. aureus</i> ; (2) Streptococcus.	Dr. A. G. Cooley	Course, six weeks. Vaccine every five days	Cured	
16/3196	Contusion of left thigh with effusion of blood beneath superficial muscles.	Pus from thigh	Streptococcus	Streptococcus	Dr. Mecke	Course, two weeks. 100 mill. every third morning.	Recovered	The vaccine in my opinion assisted very considerably in bringing about patient's recovery.
16/6655	Cellulitis	Serum culture of pus	Diphtheroid bacillus, micrococci, and <i>Staphylococcus aureus</i> .	Mixed	Dr. W. Ritchie .....	.....	.....
16/1282	Necrosis of skin (inflammatory),	Culture	Coliform	Coliform	Coast Hospital	Two injections, 50 mill. and 100 mill. at an interval of three days.	Practically cured	Saline citrate sol.
16/1809	Herpes (chronic)	Pus from pustules on face.	<i>Staphylococcus albus</i>	<i>S. albus</i>	Dr. McDonagh	Course, seven weeks	Much improved	Rheumatism for two years. Whole of face affected to neck.
16/1991	Sycosis	Pus	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Dr. J. Campbell	Course, four months. About 15 to 20 injections, 500 mill. every four to ten days.	Temporary improvement.	Other treatment—Antiparasitic ointments and lotions (mostly mercurial). Condition said to be due to local applications by some female "beauty specialist."
16/4014	Sycosis menti	Pus	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Dr. McDonagh	Course, five weeks. 500 mill. at intervals of one week.	Cured	Steaming face, &c.
16/2602	Impetigo contagiosa	Cultures	<i>Staphylococcus aureus</i> and streptococcus.	Mixed	Coast Hospital	Course, seven weeks. Initial dose, 15 mill. increased every five days until 90 mill. given. Nine injections.	Cured	Pustules showed no sign of improvement until after fifth dose, from then they began to dry. From then they began to dry. Skin and muc. hyd. cream.
16/2955	Syphilitic impetigo	Cultures from face and shoulder.	Streptococcus	Streptococcus	Coast Hospital	Course, five weeks. Initial dose 20 mill., at which it was maintained until final dose, 40 mill.	Lesions cleared up. absolutely	Surface staining only showing most, though action is very well indeed. Other treatment—Poultices and mg. hyd. ammonii to lesions. Three injections into veins of 3 gm. galyt., 45 c.c. and strep. serum subcutaneous. Potass. iodide and mercury per month. (Positive Wassermann.) Patient was a mass of sores, size of 2/1 piece. Foments, &c., and general treatment. Condition much improved. Patient able to get about and do light work.
16/1314	Ulcers of leg (indolent)	Culture and smear	<i>Staphylococcus aureus</i> and streptococcus.	(1) <i>S. aureus</i> ; (2) Streptococcus.	Coast Hospital	Course, five weeks. Initial dose, 150 mill. of No. 1. and 20 mill. of No. 2. Increased every seven days by 50 mill. of No. 1 and 10 mill. of No. 2. Last dose was 450 mill. of No. 1 and 55 mill. of No. 2.	Improved	
16/3973	.....	Swabbing and culture from wound.	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Dr. W. W. Martin, Wagga Hospital.	.....	.....
16/2277	.....	Pus	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	South Sydney Hospital	Vaccine not used.	.....
SINUSES.								
16/3346	Extensive tunnelling sinuses of the face.	Tissue and pus from face.	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Dr. F. C. Rogers .....	.....	.....	Patient improved markedly under vaccine treatment.
16/6933	Bone sinus	Culture of pus	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Dr. W. Ritchie .....	.....	.....	General surgical and tonic treatment synchronous with vaccine treatment. Reasonable to believe that vaccine treatment was probably of benefit.
16/5350	Scarlet fever, complicated by suppurating mastoiditis, arthritis and empyema.	Agar and serum cultures.	Micrococci	Micrococci	Coast Hospital	Course, two months. Twelve injections at six-day intervals of varying strength.	Improved	Surgical interference and drainage. Small sinuses leading down to humerus still discharging.
16/6927	Metastatic abscess of humerus (sub-periosteal).	Material from humerus.	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Dr. E. J. Nixon	Course, three weeks. 250 mill. to 1,000 mill.	Improving	

SINUSES—continued.

No.	Disease.	Specimen.	Organism found.	Organism from which vaccine was prepared.	Reporter.	Course, Dosage, &c.	Result.	Notes.
16/5618	Sinus, right forearm.....	Culture from sinus.....	<i>Staphylococcus aureus</i>	<i>S. aureus</i>	Coast Hospital.....	.....	.....	Patient returned to country and did not undergo treatment at Coast Hospital.
16/4892	Sinus of femur following impacted fracture of the neck.....	Pus from femur.....	Micrococci.....	Micrococcus.....	Rookwood State Hospital and Asylum.....	.....	.....	Patient died the day after the specimen was taken from him. Scraping the sinus. Small spicules of bone removed.
16/515	Osteo myelitis of tibia.....	Pus.....	Coliform bacilli and <i>B. pyocyaneus</i>	Mixed vaccine of coliform bacilli and <i>B. pyocyaneus</i>	Marrickville Cottage Hospital.....	Course, eighteen days. First dose 250 mill. Subsequent doses, 500 mill. Six doses at intervals of three days.	Improved. Amount of discharge lessened.	
16/4557	Suppurative tarsectomy wound (talipes equinovarus).	Pus from wound.....	<i>S. aureus</i>	<i>S. aureus</i>	Coast Hospital.....	Course, two and a half months. Seven injections at intervals of about ten days. First dose 125 mill., gradually increased to 400 mill. final dose.	Cured.....	General surgical measures, fomentations, incisions, &c.
16/3995	Infection of ankle joint.....	Pus.....	<i>S. aureus</i>	<i>S. aureus</i>	Balmalm Hospital.....	Course, three weeks. Three injections 50 mill., 100 mill., dose not noted in third injection.	Improved.....	General surgical treatment. Patient failed to report after third injection.
16/2780	Osteo-myelitis.....	Smears and culture.....	<i>S. aureus</i>	<i>S. aureus</i>	Coast Hospital.....	.....	.....
16/1335	Bone necrosis (leg).....	Discharge from necrosed bone.....	<i>B. pyocyaneus</i> (several occasions) and <i>S. albus</i>	<i>B. pyocyaneus</i>	St. George Cottage Hospital.....	Particulars unavailable. Reporter on Active Service.	.....
16/2462	Spinal caries.....	Pus.....	Tabercle bacilli and <i>S. aureus</i>	<i>S. aureus</i>	Dr. K. Whiting.....	Course, six weeks, 500 mill. to commence with at intervals of seven-ten days, increasing to 700 mill.	Unaffected.....	Incisions, drainage, irrigations.
16/1951	Sinus from lumbar abscess.....	Pus.....	<i>S. aureus</i>	<i>S. aureus</i>	Dr. T. Davies.....	.....	.....
17/2007								

PYÆMIA and Septicæmia (non-puerperal).

16/2615	Pyæmia, with secondary infection of discharging sinuses.	Cultures and swabbings.....	<i>B. pyocyaneus</i>	<i>B. pyocyaneus</i>	Dr. M. O'Reilly.....	Course, ten weeks. Initial dose 5 mill., increasing to 50 mill. at intervals (as a rule) of eight days.	Improved.....	There was considerable improvement. Discharge lessened and patient improved in health. Other treatment—Surgical (opening and dressing of abscesses and sinuses) along with vaccine treatment. Primary infection streptococcal. Patient died before arrival of vaccine.
16/6472	Pyæmia after scarlet fever.....	Pus, right shoulder.....	Streptococci.....	Streptococci.....	Coast Hospital.....	Vaccine not used.....	.....

INFECTIONS of the Mouth, Nose, Eye, or Ear.

16/749	Growth of lip resembling clinically an epithelioma.	Cultures and smears from lower lip.....	Staphylococci, streptococci, and <i>M. catarrhalis</i>	Mixed streptococci and <i>M. catarrhalis</i>	Dr. McDonagh.....	Course, 4 weeks.....	Practically cured.....	Neoplasm of moderate size had the macroscopical appearance of epithelioma and steadily increased for months.
16/3907	Rheumatoid arthritis.....	Swabbing from teeth.....	Streptococci.....	Streptococci.....	Sydney Medical Mission.....	Course, ten weeks. 10 mill., increased by 10 mill. each week at intervals of a week.	Improvement.....	
16/1375	Pyorrhœa alveolaris (girl, 8 years).	Cultures and swabs.....	(a) Gram positive lanceolate diplococci. Later—(b) Streptococci.	(a) Diplococci. (b) Streptococci.	Dr. E. R. Rosely.....	Course, six months. (a) Initial dose 50 mill., then 9 injections of 100 mill. (b) Initial dose, 20 mill., increased to 50 mill. (one dose), then to 100 mill. for remainder of treatment.	No improvement.....	Antiseptic mouth washes. Condition stationary. Removed to Prince Alfred Hospital for surgical treatment. Probably this was a case of Osteomyelitis, as a considerable portion of bone was necrosed. Salicylate, pot. iod. Massage, &c.
16/6593	Arthritis deformans.....	Culture from gum.....	Streptococci.....	Streptococci.....	Coast Hospital.....	Course, two months. (Patient still under treatment.) Two injections of 50 mill.	Improved.....	
16/4980	Rheumatoid arthritis.....	Throat swabbing.....	Streptococci, pneumococci, and staphylococci.	Streptococci and pneumococci.	Sydney Medical Mission.....	Patient is treated whenever his throat becomes sore. 100 mill. dosage.	Immediate improvement.....	
16/4667	Recurrent sore throats with enlarged tonsils.	Throat swabbing.....	Micrococci.....	Micrococci.....	Dr. Stephens.....	.....	.....
16/2280	Pyrexia after influenza-like attack.	Culture from throat.....	Pneumococci.....	Pneumococci.....	Dr. S. Hertford Weedon, Wagga Hospital.	Particulars unobtainable. Reporter on Active Service.	.....
16/1378	Rhinitis.....	Nasal swabbing.....	Diphtheroid.....	Diphtheroid.....	Dr. K. Whiting.....	.....	.....
16/2130		Naso-pharyngeal swab.....	Streptococci and diptheroid (?).....	Streptococci.....	Laboratory.....	.....	.....

INFECTIONS of the Mouth, Nose, Eye, or Ear—continued.

No.	Disease.	Specimen.	Organism found.	Organism from which vaccine was prepared.	Reporter.	Course, Dosage, &c.	Result.	Notes.
16/2475	.....	Discharge from eye.....	<i>S. aureus</i> and diphtheroid	Mixed <i>S. aureus</i> and diphtheroid.....	A.A.M.C. Garrison Hospital (Major Brearley). Newcastle Hospital (Dr. J. W. Smith).	Particulars unavailable. Patient on Active Service.....	.....	Profuse purulent discharge from eye.
16/2667	Hypopyon ulcer of cornea	Swabbing from eye.....	Streptococci	Streptococci	Dr. J. W. Smith, Newcastle Hospital.	.....	.....	.....
16/3474	.....	Swabbing from eye.....	<i>S. aureus</i> , <i>S. albus</i> and diphtheroid.....	Diphtheroid .....	.....	.....	.....	.....
16/6355	Chronic otitis media, with polypus	Culture from ear	<i>B. pyogenicus</i>	<i>B. pyogenicus</i>	Dr. G. W. Mason.....	Course, six weeks. (Patient still under treatment.) First dose, 50 mill., subsequent dosage 100 mill. every fourth day.	Slight improvement.....	Other treatment—styptics and astringents to the granulations showing.
INFECTIONS of the Urinary Tract.								
16/1115	Bacilluria	Urine	Coliform	Coliform	Balmalm Hospital.....	Six doses, 50, 100, 250, 500, 500, 500 mill.....	Cured.....	Other treatment—Alkalis in large doses. This was a very severe case, rigors and high temperature, with thick pus in urine. Vaccine was not used until the temperature was normal. The pus cleared up completely. No other treatment.
16/122	Pyelitis	Urine	Coliform	Coliform	Dr. M. Archdall .....	.....	.....	.....
16/223	Coliform infection of long duration, with recurrent attacks of pyrexia and cystitis.	Urine	Coliform	Coliform	Dr. J. Macpherson.....	Course, six months	Uncertain: apparently improvement.	.....
16/630	Bacilluria	Urine	Coliform	Coliform	Cessnock Hospital .....	.....	.....	Pus cells present. Patient did not complete treatment as she left the district.
16/658	.....	Urine	Coliform	Coliform	Dr. M. Ritchie.....	Course, about two weeks. Initial dose 100 mill., two doses at intervals of four days of 250 mill.	.....	.....
16/797	.....	Urine	Coliform	Coliform	Wagga Hospital .....	.....	.....	Pus cells numerous.
16/984	.....	Urine	Coliform	Coliform	Cessnock Hospital	Course, fourteen days. Seven doses were given, starting with 60 mill. every alternate day and increasing to 180 mill.	Apparently cured.....	Ferile condition vanished and urine became normal. Urotropin given.
16/1061	Pyelitis	Urine	Coliform	Coliform	David Berry Hospital.....	.....	.....	Patient refused to undergo treatment.
16/1696	Bacilluria	Urine	Coliform	Coliform	Dr. W. Ritchie.....	.....	.....	Great relief to kidney symptoms, after each course of vaccine.
16/5238	Coliform infection of kidney from the bladder and ureters.	Urine	Coliform	Coliform	Dr. R. Bowman	Course, two and a half years. 500 mill. at one to two weeks' intervals.	Greatly relieved	This case has been under my observation for the last 15 years. I am satisfied that the vaccine treatment gives most relief.
16/2096	Coliform infection of kidney and bladder.	Urine.....	Coliform (several occasions)	Coliform	Dr. A. G. Cooley	Course, two months. 500 mill. every five days.	Much better	Urotropin, pot. citr., &c.
16/2419	.....	Urine.....	Coliform	Coliform	Cessnock District Hospital .....	.....	.....	Urotropin synchronously.
16/2554	Pyuria—(?) Pyelitis	Urine.....	Coliform (on several occasions), with streptococcus once and diplococcus once.	Coliform (several occasions), coliform and streptococcus (once), diplococcus alone (once).	Dr. E. K. Herring	Course, nine months. 500 mill. of coliform and mixed vaccines, 100 mill. of diplococcal vaccine.	Unimproved.....	.....
16/2707	Bacilluria	Urine.....	Coliform	Coliform	Balmalm Hospital .....	.....	.....	.....
16/2554	.....	Urine.....	Coliform	Coliform	Tamworth Hospital	Course, three weeks. 125 mill., increased every two days till patient received 350 mill.	Urine cleared up.	.....
16/2802	Nocturnal incontinence	Urine.....	Coliform	Coliform	Dr. Marr	Vaccine not used. Patient failed to return for treatment.	.....	Pus present.
16/3153	Coliform pyelitis	Urine.....	Coliform	Coliform	Coast Hospital.....	Course, about four weeks. Six doses, ranging from an initial dose of 100 mill. to a final dose of 750 mill. Average increase in dose, 140 mill. Intervals between doses three, two, four, six, and thirteen days.	Cured.....	Patient had had pyelitis two years previously, and during interval had never been free from somewhat frequent urination and slightly "cloudy" urine. When last seen all symptoms had quite gone and urine was free from pus, mucus, and bacilli. Hexamethylene tetramine. &c.
16/3188	Pyuria (Pyelitis)	Urine.....	Coliform	Coliform	Dr. Crookston, Camden Cottage Hospital.....	.....	.....	.....

INFECTIONS of the Urinary Tract—continued.

No.	Disease.	Specimen.	Organism found.	Organism from which vaccine was prepared.	Reporter.	Course, Dosage, &c.	Result.	Notes.
16/3453	Pyelitis	Urine	Coliform	Coliform	Royal Hospital for Women	Course, five weeks. 25 mill., increased by 12½ mill. every three to four days.	Cured	Other treatment—Urotropin and pot. citrate.
16/3567	Bacilluria	Urine	Two types of coliform	Mixed coliform	Dr. J. A. J. Murray	Course, six and a half weeks. Seven doses. 400 mill., gradually increased to 1,900 mill.	Improved	Before vaccine treatment was used, tonics, alkaline stomachics, and for several months pot. citrate were used without any marked benefit.
16/3731	Cystitis	Urine	Coliform	Coliform	Dr. J. J. O'Keefe	Course, four weeks. Four injections, 100, 150, 200, 250 mill.	Cured	General urinary treatment, pot. cit., buchu, urotropin &c.
16/3766	Coliform pyelitis	Urine	Coliform (two occasions)	Coliform	Coast Hospital	Course, five weeks. 20 mill., increased to 200 mill.	Improved	Other treatment—Urinary antiseptics, &c. Patient failed to report after the fifth injection.
16/3915		Urine	Coliform	Coliform	Balmalm Hospital			
16/3993		Urine	Micrococci	Micrococci	Balmalm Hospital			
16/4113	Pyelitis	Urine	Coliform	Coliform	Royal Hospital for Women	Course, three weeks. Initial dose, 28 mill., increased by 12 mill., and remained at 50 mill.	Cured	Pot. citrate and buchu. Pus in urine. Left kidney tender.
16/4255	Pyelitis	Urine	Coliform	Coliform	Royal Hospital for Women	Course, three weeks. Six injections. Initial one 25 mill., increasing to 50 mill.	Cured	Urotropin.
16/4321	Pyelitis and cystitis	Pus from urine	Coliform	Coliform	Dr. J. A. Watt			
16/4365	Pyelitis	Urine	Coliform	Coliform	Tamworth Hospital	Course, thirteen days. Eight injections, 60 mill., gradually increased to 500 mill.	Cured	The successful treatment of this case was due to the use of the vaccine.
16/4448	Pyuria, with alkaline urine	Urine	Coliform	Coliform	Sydney Medical Mission	Course, about three weeks. 50 mill., increased by 10 mill. per week.	Great improvement.	Hexamine before vaccine treatment. Mist. pot. bicarb. and bladder irrigation given all through.
16/4491	Coliform infection	Urine	Two types of coliform bacilli	Mixed coliform	Dr. A. G. Cooley	Vaccine was not used as patient failed to report for treatment.		Patient left district. Began with gonorrhoeal infection.
16/4630	Bacilluria	Urine	Coliform	Coliform	Balmalm Hospital	Course, eight weeks. 5 mill. to 50 mill. at intervals of seven days.	Much improved	Previous treatment, pot. cit.
16/5069		Urine	Coliform	Coliform	Dr. F. Ether			
16/5285	Coliform infection of bladder	Urine	Coliform	Coliform	Dr. C. R. Hodgson	Patient refused treatment		
16/5321		Urine	Coliform	Coliform	Dr. Brodowski			
16/5332	Coliform pyelitis with erosion of the cystix	Urine	Coliform	Coliform	Coast Hospital	Vaccine treatment was not carried out owing to rapid improvement with medicinal treatment before arrival of vaccine.		
16/5324	Coliform infection of urinary tract	Urine	Coliform	Coliform	Dr. Scott Good	Course, three weeks. 250 mill. every five days for three doses, then 500 mill. for two doses.	Cured	Urinary antiseptics.
16/5559	Coliform infection	Urine	Coliform	Coliform	Sydney Medical Mission			
16/5566	Bacilluria with appendicitis	Urine	Coliform	Coliform	Coast Hospital	Course, three weeks. Four injections, 50, 100, 200, 500 mill.	Cured	Other treatment in earlier stage, pot. cit., later, hexamine before vaccine treatment. Medicinal treatment appeared to have no good effect after six weeks' trial.
16/5585	Coliform infection of kidney	Urine	Coliform	Coliform	Dr. Guy Menzies			
16/6808	Pyelitis, preceded by renal calculus	Urine	Coliform	Coliform	Dr. Chapman			
16/6207		Urine	Coliform	Coliform	Balmalm Hospital			
16/6248		Urine	Coliform	Coliform				
16/6368		Urine	Coliform	Coliform	Balmalm Hospital			
16/6644	Chronic "distension," following operation for stone in right kidney	Urine	Coliform	Coliform	Dr. Clappie	Course, one month. 50-100 mill.	Relieved	Free from attack for two and a half months. Patient intends to have more injections.
16/6749	Pyelitis	Urine	Coliform (two occasions)	Coliform	Dr. J. W. Harbison			Other treatment—Hexamine and buchu mixture.
16/6835		Urine	Coliform	Coliform	Dr. E. A. Wherrett	Started with 125 mill., two injections a week; dose gradually increased by 10 mill. until 350 mill. given.	Cured	
16/6835		Urine	Coliform	Coliform	Balmalm Hospital			

INFECTIONS of the Urinary Tract—continued.

No.	Disease.	Specimen.	Organism found.	Organism from which vaccine was prepared.	Reporter.	Course, Dosage, &c.	Result.	Notes.
16/6918	Bacilluria in a child (girl).....	Urine.....	Colon bacilli.....	Colon bacilli.....	Dr. J. A. J. Murray.....	Course, about four or five weeks, with 250 mill., gradually increased at intervals of about five days to 625 mill. Course, ten weeks. Nine injections. Initial dose, 50 mill., gradually increased to 500 mill.	Slight improvement.....	Other treatment: Pot. citrate.
16/6920	Bacterial infection of kidneys and urinary tract. (Girl, 6 years).	Urine.....	Colon bacilli and cocci.....	Mixed colon bacilli and cocci.....	Dr. W. Mawson.....	Course, ten weeks. Nine injections. Initial dose, 50 mill., gradually increased to 500 mill.	Improved.....	Other treatment: Alternate alkali and formin and acid.
16/6942	Coliform cystitis.....	Urine.....	Colon bacilli.....	Colon bacilli.....	Dr. R. Balls.....	Course, thirty-two days. Initial dose, 30 mill., gradually increased to 600 mill.	Cured.....	Other treatment: Formin. (Synchronously).
16/7080	.....	Urine.....	Colon bacilli.....	Colon bacilli.....	Cessnock Hospital.....	.....	.....	.....
16/1880	.....	Urine.....	Coliform.....	Coliform.....	Balmaln Hospital.....	.....	.....	.....
16/1880	Cystotomy followed by pyuria.	Urine.....	<i>Staphylococcus albus</i> , later colon bacilli and <i>B. proteus</i> .	<i>Staphylococcus albus</i> , later mixed coliform and <i>B. proteus</i> .	Balmaln Hospital.....	.....	.....	.....
16/4507	.....	.....	.....	.....	.....	.....	.....	.....
16/6010	Cystitis.....	Urine.....	<i>Staphylococcus albus</i>	<i>Staphylococcus albus</i>	Armidale Hospital.....	Course, about five weeks. 250 mill. to 500 mill. at four day intervals. Eight injections.	Cured.....	This patient was somewhat toxic and certainly improved after vaccine treatment was begun, and is now quite well. Pus in urine.
16/6613	.....	Urine.....	Coliform bacilli of two types, <i>B. proteus</i> and gram positive coccobacilli; later bacillus of an unknown type, and <i>Staphylococcus albus</i> .	Bacillus of unknown type.....	Dr. E. A. Wherrett.....	Patient refused treatment.....	.....	.....
16/6742	Renal colic.	Urine.....	Coliform.....	Coliform.....	Dr. E. A. Wherrett.....	Course, six days. 60 mill. increased to 500 mill. Four injections.	Improved.....	Bladder irrigation and salol given during vaccine treatment.
16/1019	Pus in urine after caesarian hysterectomy.	Urine.....	Coliform and <i>B. proteus</i> (two occasions).	Mixed coliform and <i>B. proteus</i> .	Tamworth Hospital.....	.....	.....	Quin. sulph afterwards.
16/1153	.....	Urine.....	<i>B. fecalis</i> alkaligenes. Later coliform and <i>B. proteus</i> .	Coliform and <i>B. proteus</i>	St. George Cottage Hospital.....	Course, two months. 150 mill. every five days. Two injections. 50 mill. and 100 mill.	Slight improvement.....	Male. Had previously had gonorrhoea.
16/6287	Coliform infection of bladder and kidney.	Urine.....	Coliform and <i>B. proteus</i>	Coliform and <i>B. proteus</i>	Balmaln Hospital.....	.....	Complete recovery.....	Urinary antiseptics were used for some weeks without result.
16/427	Pyelitis, complicating pregnancy.	Pus from urine.....	Coliform.....	Coliform.....	Tenterfield Hospital.....	Course, sixteen days. 10 mill. gradually increased to 400 mill. Seven injections.	Practically cured.....	For three weeks patient was treated with urotropin, &c., without much benefit. After three injections with vaccine fever disappeared and pus greatly reduced. Discharged from hospital practically well.
16/1171	Pyo-nephrosis of pregnancy..	Urine.....	Coliform.....	Coliform.....	Royal Hospital for Women.....	Course, two and a half weeks. 500 mill. per dose, two doses a week.	Improved.....	Rest, diet, &c., before starting on vaccine, since then no other treatment.
16/3575	Toxemia of pregnancy. Persistent colitis, with profuse diarrhoea.	Urine.....	Fluorescent gram negative bacillus (two occasions).	Fluorescent gram negative bacillus.	Coast Hospital.....	Course, six weeks. 100, 200, 250 mill. Dose increased by 50 mill. every seven days for four injections.	Improved.....	Pregnancy terminated naturally.
16/4606	Pyelitis complicating pregnancy.	Pus (urine?).....	Coliform, streptococci and diptheroids.	Coliform.....	Dr. J. A. Watt.....	Course, one month. 100, 25 and 50 mill. After third injection, temperature became normal and urine free from pus.	Recovered.....	Hexamin was not well tolerated during very acute stage. Alkalis seemed to do most good then. Dead fetus removed ten days after first injection.
16/6040	Pyelitis with pregnancy.....	Urine.....	Colon bacilli.....	Colon bacilli.....	Dr. P. Blackall.....	One dose of 5 mill. ....	.....	The case improved so rapidly that no more vaccine was given.
16/2765	Infection following gonorrhoea.	Urine.....	<i>Staphylococcus albus</i> (two occasions, then sterile).	<i>Staphylococcus albus</i>	Dr. M. Archdall.....	About twelve injections were given, beginning with 100 mill. and increasing to 500 mill. at fourth injection, at which strength remaining doses were given.	Cured.....	Urinary antiseptics by mouth.

INFECTIONS of the Urinary Tract—continued.

No	Disease.	Specimen.	Organism found.	Organism from which vaccine was prepared.	Reporter.	Course, Dosage, &c.	Result.	Notes.
16/1616	Basal cystitis and chronic urethritis.	Urine.....	Coliform	Coliform	Dr. H. C. R. Darling.....	Course, six weeks. 50 mill., increased to 500 mill. Twelve injections.	Marked improvement.....	Hexamin. and occasionally irrigation.
16/163	Pyelitis and inflammation of the gall bladder.	Urine.....	No growth; later, coliform.	Coliform	Tamworth Hospital	Course four days. Three injections, 125, 250, and 500 mill.	Improved	Urotrophin, pot. acet., hyoscynam. and bichlu.
INFECTIONS of the Uterus and Adnexa.								
16/262	Pyemic abscesses after septic abortion.	Pus.....	<i>E. pyogenicus</i>	<i>E. pyogenicus</i>	Dr. W. Ritchie	Course, four weeks. 250 mill. and 500 mill. every four days.	Cured	Tonics and surgical treatment. Patient improved more rapidly after vaccine treatment was begun.
16/3712	Puerperal pyemia.....	(a) Culture from cervix uteri.	(a) Streptococci, and negative bacilli.	(a) Mixed vaccine of streptococci and negative bacilli.	Coast Hospital.....	(a) Course, two and a half months. Eight injections, initial dose, 50 mill., increased to 500 mill., final dose.	Cured	Collection of pus in false pelvis evacuated. Drugs, quinine, iron, terebinth. subcutaneously to induce abscess formation.
16/3213		(b) Pus from groin.....	(b) Streptococci.	(b) Streptococci.		(b) Course, ten days. 50, 100 and 100 mill. Course, one week.....		Patient died.
16/3533	Puerperal septicemia	Broth blood culture.....	Cocci-bacilli.....	Cocci-bacilli.....	Coast Hospital.....	One dose only of 10 mill.....	Cured	General treatment, vaginal douches, &c. Vaccine arrived when patient had commenced to improve, and it is doubtful whether or no vaccine contributed to the cure.
16/3732	Sepsis following child-birth.	Material from uterus	<i>B. prodigiosa</i>	<i>B. prodigiosa</i>	Dr. M. O'Reilly			Patient died.
16/1870	Sepsis followed by puerperal septicemia.	Swabbing from uterus	Streptococci	Streptococci	Dr. L. Halse Rogers	Three injections; dose uncertain.....	No improvement.....	
13/1735	Puerperal septicemia.....	Swabbing from uterus	Streptococci	Streptococci	Royal Hospital for Women	Not used.....		Patient died before arrival of vaccine.
16/5053	Pyrexia after confinement...	Vaginal swab	Diphtheroid and gram positive cocci.	Mixed diphtheroid and gram positive cocci.	Dr. A. G. Cooley	Course, one month. 30 mill. every five days.	Cured	Particulars unobtainable. Reporter on Active Service.
16/1379	Pyrexia after confinement...	Swab from cervix.....	Diphtheroid and coliform ..	Mixed vaccine of diphtheroid and coliform.	Dr. L. Hughes			
16/3994		Uterine swab	Diplococci.....	Diplococci.....	Balmah Hospital.....			
16/5214	Pyo-salpinx (double)	Agar culture from wound.	Coliform and streptococci ..	Mixed coliform and streptococci.	Coast Hospital.....	Course, three months. 100 mill. increased to 500 mill., of which amount five injections were administered.	No improvement.....	Chronic alcoholism. Wassermann test positive. Patient died.
16/5839	Pelvic abscess	Pus from abscess.....	Diphtheroid. Later diphtheroid and <i>S. aureus</i> .	Diphtheroid. Later diphtheroid and <i>S. aureus</i> .	Dr. J. Campbell	Course, nine weeks. 500 mill. at weekly intervals.	Cured	Abdominal section. Drainage. Injections commenced five weeks after operation, as temperature was still raised. Temperature fell after each injection (except for rise after reaction), and gradually came to normal.
16/1978		Uterine swab	Diplococcus, and <i>Staphylococcus aureus</i> , ...	Diplococcus	Dr. P. Lalor			

INFECTIONS of the Intestinal Tract, including Intestinal Fistula.

16/2489	Dysenteric diarrhoea	Fæces	<i>B. proteus</i>	<i>B. proteus</i>	Dr. E. K. Herring			Vaccine not used, patient being so improved that it was thought inadvisable. Is now practically well.
16/2616	Septic abdominal wound, with general peritonitis following acute appendicitis.	Pus from wound	Coliform bacilli and diphtheroids.	(1) Coliform..... (2) Diphtheroid.	Dr. H. Busby, Eathurst Hospital.	Course, twelve days.....	Cured.....	Before vaccine treatment wound was excessively dirty. No attempt at healing. Wound cleaned up rapidly, and finally closed perfectly. No hernia. Wound dressed with eusol.

INFECTIONS of the Intestinal Tract, including Intestinal Fistula—continued.

No.	Disease.	Specimen.	Organism found.	Organism from which vaccine was prepared.	Reporter.	Course, Dosage, &c.	Result.	Notes.
16/4768	Cæcal fistula following operation for gangrenous appendix.	Pus	Diphtheroid, gram negative bacilli, <i>B. proteus</i> , and streptococci.	Mixed vaccine	Rookwood State Hospital and Asylum.	Course, two weeks. 50 mill. per dose. Seven doses.	Cured	The patient went out cured, whether as the result of the vaccine treatment or operative treatment, or partly due to both, or as much due to natural processes or a combination of all three, it is hard to say. After operation and treatment, the wound was dressed frequently with various antiseptics. This patient was operated on with the object of closing the original fistula. Some seven or nine days after operation the wound broke down, and discharged pus (from which the vaccine was made) and later faeces. After three to four weeks the discharge lessened in all respects, and gradually the abdominal wound closed, so that the patient left hospital with his wound healed.
16/5382	Perforating appendicitis	Swabbing from abdominal wound.	<i>S. aureus</i>	<i>S. aureus</i>	Dr. H. Busby, Bathurst Hospital.	Course, three weeks. 50 mill., increased by 50 per cent. administered every third day.	Cured	Before vaccine wound dirty and slow to heal. After treatment wound rapidly cleaned up and closed slowly. Wound cleaned four times in twenty-four hours. Operation and drainage. "Very virulent infection, causing gangrene of tissues."
16/5073	Appendical abscess	Culture from pus	Colliform	Colliform	Dr. W. Ritchie	About eight injections. 250 mill. and 500 mill.	Indefinite	
16/2590 16/2671 16/7076 17/2211	Chronic diarrhoea	Pus from abdominal wound. Faeces	Streptococci	Streptococci	Dubboo Hospital .....	.....	.....
			<i>B. proteus</i>	<i>B. proteus</i>	Dr. R. Bowman	Course, three months. Patient still under treatment.	Improved	
INFECTIONS of the Respiratory System.								
16/335	Empyema	Pus from sinus	Colliform	Colliform	Coast Hospital	Course, six weeks. Seven injections. Initial dose 200 mill., gradually increased to 500 mill. at final dose.	Improved	General treatment. Drainage. Sinus in thorax discharging slightly. Patient has improved in weight and generally.
16/4222	Empyema and secondary septicaemia.	Pus	Colliform bacilli, streptococci and diphtheroids.	Mixed vaccine of colliform bac., streptococci, and diphtheroids.	Dr. R. W. H. Maffey	Patient died before the vaccine could be used	.....
16/4223	Empyema	Pus	Staphylococci	Staphylococci	Dr. Hilton Smith	Course, one month. 80 mill. to 500 mill., gradually increased and given every fourth day.	Recovered	General treatment, forced expectoration by Woolf's bottles. Quinine.
16/5915	Empyema (three months' standstill).	Pus	<i>S. aureus</i>	<i>S. aureus</i>	Dr. Ritchie	Course, six weeks. 250 mill. and 500 mill. at intervals of four days.	Indefinite	Vaccine was thought to cause some quickening of convalescence. Other treatment, resection of rib and drainage.
16/2857 16/6225	Empyema	Pus	Colliform bacilli.	Colliform bacilli.	Balmalm Hospital	Course, six weeks. 50 mill., increased to 500 mill.	Cured	Expectoration cleared up rapidly. cough has disappeared. Tr. bellad.
16/450	Bronchitis	Sputum	Gram positive cocci, gram negative cocci, and colliform bacilli.	Mixed gram positive and gram negative cocci and colliform bacilli.	Dr. W. Mawson	Course, two weeks. 50, 75, 100 mill.	Improved	Tub. bacilli not detected. Did not remain under treatment till cured.
16/5067 16/5091	Chronic bronchitis and bronchiectasis. Chronic bronchitis	Sputum	Streptococci and other micrococci.	Mixed streptococci and micrococci.	Dr. Scott Good	Course, six weeks. 25 mill., gradually increased to 150 mill. Seven injections.	Definite improvement	No other treatment. Tub. bac. not detected.
			Micrococci	Micrococci	St. George Cottage Hospital.	.....	.....	Tub. bac. not detected.

INFECTIONS of the Respiratory System—continued

No.	Disease.	Specimen.	Organism found.	Organism from which vaccine was prepared.	Reporter.	Course, Dosage, &c.	Result.	Notes.
16/5785	Chronic bronchial catarrh (of very old standing).	Sputum	Streptococci, <i>M. catarrhalis</i> , and staphylococci.	Mixed streptococci, <i>M. catarrhalis</i> , and staphylococci.	Dr. R. Bowman	Course, seven weeks. Eight injections of 500 mill.	Very good	Tub. bac. not detected. Patient is now better than for years with very little cough. Other treatment, tonics, expectorants, plenty of food, &c.
16/5832	Chronic bronchitis	Sputum	Pneumococci	Pneumococci	Dr. W. Mawson	Course, one month. 50 mill., gradually increased to 250 mill. every five or six days.	Cured	Patient had pneumonia four years ago. Had morning cough and expectoration. Cough and health below par. General expectoration have ceased. General health now excellent. Tubercle bacilli not detected. General treatment, cough mixtures, &c.
16/6500	Chronic bronchitis (old)	Sputum	Coliform bacilli and cocci	Mixed coliform and cocci	Dr. R. Bowman	Course, one month. Dose, 500 mill.	Improved (has better nights).	Tubercle bacilli not detected.
16/6722	Chronic bronchial cold	Sputum	Coliform bacilli, <i>M. catarrhalis</i> , and staphylococci.	Mixed coliform, <i>M. catarrhalis</i> , and staphylococci.	Dr. R. Bowman			
16/1421	Chronic cold with bronchitis	Sputum	Pneumococci	Pneumococci	Dr. R. Bowman	Course, three weeks. 100 mill. every week	Greatly improved	Patient gained 4 lb. Cold better. Patient did not return, presumably much better. Other treatment, tonics and good feeding.
16/3890	Chronic cough	Sputum	Coliform bacilli and micrococci.	Mixed coliform and micrococci.	Bathurst Hospital	Course, sixteen days.	Apparent cure. No cough.	Tub. bac. not detected. Patient gained weight. During vaccine treatment large doses of nuxvomica were given.
16/4403	Chronic catarrhal cold and pleurisy.	Sputum	<i>Staphylococcus aureus</i> and <i>altus</i> .	Mixed <i>S. aureus</i> and <i>S. altus</i>	Dr. R. Bowman	Course, two and a half months. 250 mill. per dose for eight doses at seven to fourteen days' intervals.	Improved	Tub. bac. not detected. Before treatment there was loss of weight and strength. Patient has now gained 8 lb. General strength improved, cough and cold gone.
16/4408	Asthmatic bronchitis	Sputum	Streptococci and gram negative bacilli.	Mixed streptococci and gram negative bacilli.	Dr. R. Bowman	Course, two and a half months. Six injections (500 mill.) at intervals of from one to three weeks.	Cured	Tub. bac. not detected. Patient is quite well now. The vaccine seemed to clear up the cold, and there has been no return of asthma, which had been chronic. Other treatment, expectorant mixture.
16/4559	Chronic cold	Sputum	Streptococci, diptheroid bac, and <i>M. catarrhalis</i> .	Mixed streptococci, diptheroid bac, and <i>M. catarrhalis</i> .	Dr. R. Bowman	Course, one month. Eight injections (100 mill.).	Cured	Tub. bac. not detected. Patient is now quite well. He was so satisfied that he would not have any further treatment nor was it necessary. Other treatment, tonics and forced feeding.
16/5015	Chronic catarrhal cold (girl, 9 years).	Sputum	Gram positive cocci and diptheroid bacilli.	Mixed cocci and diptheroid bacilli.	Dr. R. Bowman	Patient left for country. Lost sight of.		Tub. bac. not detected.
16/6195	Chronic catarrhal cold	Sputum	Pneumococci	Pneumococci	Dr. R. Bowman	Course, five weeks. 500 mill. Still under treatment.	Improving	Tub. bac. not detected. Cold mending.
16/6609	Chronic laryngitis and old bronchial coll.	Sputum	Pneumococci	Pneumococci	Dr. R. Bowman	Course, two months. Eight injections 500 mill.	Cured	Tub. bac. not detected. Laryngitis quite well. Bronchial cold cured. Tonic.
16/5694	Bronchial catarrh (of five years standing).	Sputum	<i>M. catarrhalis</i> and streptococci.	<i>M. catarrhalis</i> and streptococci.	Dr. R. Bowman	Course, three weeks. 500 mill. Seven injections.	Good	Tub. bac. not detected. Cold cleared up. Gain of 10 lb. Tonics, out-door sleeping, &c.
16/6251	Chronic catarrhal bronchitis	Sputum	Coliform	Coliform	Dr. R. Bowman	Course, six weeks. Still under treatment. Seven injections (300 mill.).	Slight improvement only.	Tub. bac. not detected. Patient is rather frail and generally delicate. Tonics, cough mixture, &c.

INFECTIONS of the Respiratory System—continued.

No.	Disease.	Specimen.	Organism found.	Organism from which vaccine was prepared.	Reporter.	Course, Dosage, &c.	Result.	Notes.
16/5454	Chronic bronchitis and asthma.	Sputum	(a) Thick gram negative bacilli and streptococci. (b) Colliform bacilli and micrococci. (c) Dift.	Mixed vaccines of each consecutively.	Dr. R. Bowman	Course, eight months. Vaccine given once a week for two months, then every fortnight.	Improving	Tub. bac. not detected (four occasions). Patient is better, no bad asthma, is still bronchitic, but is quite sure the vaccine does him good.
16/1242		Sputum	Pneumococci and a yeast.	Pneumococci	Dr. Hull			
16/3565		Sputum	Pneumococci, <i>M. catarrhalis</i> , and colliform bacilli.	Streptococci	Dr. Lalor			
16/3233		Sputum	Cocci (pneumococci, &c.)	Mixed cocci	Coast Hospital	Vaccine was not used as patient had made favourable progress.		Tub. bac. not detected.
16/153	Unresolved lobar pneumonia	Sputum	Pneumococci	Pneumococci	Dr. Guthrie Hunter	Course, one month. 10 mill. gradually increased to 75 mill. Six injections.	Apparently no effect	Tub. bac. not detected. Synchronously with vaccine has been having an expectorant tonic mixture. Vaccine did not appear to affect condition at all.
16/5115	Double pneumonia, followed by double empyema and general septicaemia.	Pus	<i>Staphylococcus aureus</i>	<i>Staphylococcus aureus</i>	Dr. R. W. H. Maffey	Course, six days. Three injections, 100 mill., 160 mill., 240 mill.	Patient died	Abscess formation ceased. Ears improved. Arthritis much better. Other treatment, Urotropin, drainage of abscess, tonics.
16/5487	Influenza, followed by otitis media and abscess formation; arthritis of right knee.	Sputum	Streptococci and <i>M. catarrhalis</i> .	Mixed streptococci and <i>M. catarrhalis</i> .	Dr. J. A. J. Murray	Course, four weeks. 250 mill., gradually increased to 750 mill.	Much improved	
16/3880	Septic pneumonia and arthritis.	Pus	<i>Staphylococcus aureus</i>	<i>Staphylococcus aureus</i>	Condon Clin Hospital	Vaccine was not administered. Patient died on the day on which the vaccine was received.		
16/128	Broncho-pneumonia, left purulent pleurisy, abscess of left lung.	Sputum	<i>Staphylococcus aureus</i> and gram positive diplococci.	Mixed <i>Staphylococcus aureus</i> and gram positive diplococci.	Manilla Hospital	Course, three weeks. Seven injections, 150 mill., increased to 250 mill. after first injection.	Much improved	Tub. bac. not detected. Sputum diminished considerably. Breath still very offensive.
16/4489	Abscess of right lung, following inhalation of a tooth, bronchiectasis.	Sputum	(a) Pneumococcus. (b) Streptococcus. (c) Streptococcus, pneumococcus.	Vaccine of each consecutively	Dr. F. West	Course, six months. 50 mill., increased by 10 mill. at each dose until 150 mill. given. Intervals of dosages, six days.	Most satisfactory	Physical signs nearly all cleared up. Patient gained 1½ stone in weight. The most marked result of injection was always the profuse expectoration after twenty-four hours.
16/5898	Abscess of lungs, following scarlet fever, complicated by thrombosis of veins of leg, pleurisy and pneumonia.	Pus (coughed up)	Diphtheroid bacilli and streptococci.	Mixed diphtheroid and streptococci.	Dr. W. Mawson	Course, one month. 50 mill., increased to 200 mill. every four or five days. Seven injections.	Much improved, especially since second dose of vaccine, but hard to say whether <i>post hoc</i> or <i>propter hoc</i> .	Expectoration lessened, became less offensive and gradually ceased. Other treatment—Expectorants, tonics, open air, liberal feeding, &c.
16/1524	Bronchiectasis	Sputum	(a) Diplococci and colliform bacilli. (b) <i>M. catarrhalis</i> and small gram negative bacilli. (c) <i>M. catarrhalis</i> .	(a) Mixed vaccine (b) <i>M. catarrhalis</i> and small bacilli. (c) <i>M. catarrhalis</i> .	Dr. J. Sheddon Davis, Marrickville Cottage Hospital.	(a) Course, six weeks. 100 mill. to 500 mill. in five injections. (b) Course, six weeks. 100 mill. to 800 mill. in five injections. (c) Course, four months. 500 mill., increased to 1,500 mill. in fortnightly doses.	(a) Parents consider child better after injections. Seemed cough and fever less. (b) No improvement. (c) Great and progressive improvement. All signs of activity gone.	Tub. bac. not detected (four occasions). While having vaccine patient had fewer feverish attacks and definitely felt better.
16/2672	Bronchiectasis	Sputum	(a) <i>M. catarrhalis</i> (b) Pneumococci. (c) Pneumococci.	(a) <i>M. catarrhalis</i> (b) Pneumococci. (c) Pneumococci.	Dr. R. M. Crookston	(a) Course, two months. 50 mill. to 100 mill. in seven injections. (b) Course, twenty-five weeks. 100 mill. at intervals of three weeks.		Tub. bac. not detected (three occasions). This is a case of ten years' duration. Practically moribund when first seen, and the results have been extraordinarily good. The patient except for the results of old infection is now a healthy girl. Colour good, weight increasing. May be considered a complete cure.
16/6639	Bronchiectasis	Sputum	(a) Pneumococci (b) Streptococci.	(a) Pneumococci (b) Streptococci.	Dr. C. Purser	(a) 50 to 100 mill. once a week. (b) Course, a few weeks. 500 mill.	(a) Sputum slightly lessened in amount, and odour not so offensive. (b) A very slight improvement.	Other treatment, nil.

INFECTIONS of the Respiratory System—continued.

No.	Disease.	Specimen.	Organism found.	Organism from which vaccine was prepared.	Reporter.	Course, Dosage, &c.	Result.	Notes.
16/5343	Bronchiectasis	Sputum	Streptococci and <i>M. catarrhalis</i> .	Streptococci and <i>M. catarrhalis</i> .	Dr. J. Shedden Davis, Marrickville Cottage Hospital.	Course, about two months. 121 milli. gradually increased to 150 milli. at about weekly intervals.	Treatment being continued.	Tub. bac. not detected.
16/5303	Bronchiectatic cavity of lung	Sputum	Streptococci and <i>M. catarrhalis</i> .	Mixed vaccine	Dr. C. Purser	Course, two years	Improved	Tub. bac. not detected.
16/4332	Broncho-pneumonia	Sputum	<i>Staphylococcus albus</i> and <i>S. aureus</i> .	Mixed <i>S. albus</i> and <i>S. aureus</i> micrococci	Dr. R. G. Alcorn	Vaccine not used. Case had nearly recovered on receipt.	Cured, though the T. fell to normal at once.	Tub. bac. not detected.
16/6067	Broncho-pneumonia after pertussis (age 11 years).	Sputum	Gram positive micrococci	Micrococci	Dr. Hesham	One injection of 80 milli.	The cure seems too sudden to be attributed chiefly to the vaccine.	Tub. bac. not detected. Drugs, open air, &c.
16/6059	Broncho-pneumonia (?) and acute bronchitis (age over 70 years).	Sputum	(a) Micrococci and diphtheroid bacilli, (b) <i>M. catarrhalis</i> and streptococci.	(a) Micrococci and diphtheroid, (b) <i>M. catarrhalis</i> and streptococci.	Dr. R. Bowman	(a and b) Course, three months (still under treatment). 500 milli. at seven day intervals.	(a) Great improvement (b) Still under treatment.	(a) Tub. bac. not detected. Gain in weight and strength. Cough and sputum much less. Well on way to recovery. Tonics, cough mixture, &c.
16/1480	Tuberculosis	Sputum	Streptococci	Streptococci	Dr. J. J. O'Keefe, St. George Cottage Hospital.	Patient died before arrival of vaccine	Unimproved	Tub. bac. not detected (two occasions).
16/1707	Pulmonary tuberculosis	Sputum	Streptococci	Streptococci	Dr. J. Shedden Davis	Six small doses (about 10 milli.) were given, but patient was going down and so evidently that treatment was discontinued.	Unimproved	Tub. bac. present.
16/2152	Pulmonary tuberculosis	Sputum	Streptococci	Streptococci	Balmah Hospital	Vaccine was not used, as it was thought inadvisable to do so.	Unimproved	Tub. bac. present.
16/5005	Chronic fibroid phthisis	Sputum	<i>M. catarrhalis</i> and pneumococci.	Mixed <i>M. catarrhalis</i> and pneumococci.	Dr. P. T. Thane	(a) Course, three months. 10 milli. to 100 milli. 100 milli. repeated twice and 200 milli. five times on account of slight reactions.	(a) Improved	Tub. bac. present. Gained in weight. Small doses of P.T.O. were added to the last five injections. This patient seemed moribund, and I feel sure the vaccines did him a great deal of good.
10/6814	Pulmonary tuberculosis	Sputum	(a) Irregular streptococcus (?), pneumococcus, (b) Gram positive cocci and diphtheroid, (c) As in (a).	(a) Streptococcus, (b) Mixed vaccine, (c) Mixed vaccine.	Dr. P. R. Boelke	(b) Course, three months. 50 milli., 75 milli., then increased by 50 milli. weekly.	(b) Improved. (c) Under treatment.	Tub. bac. present. Small gain in weight. Cough less.
16/6584	Pulmonary tuberculosis	Sputum	Streptococci and <i>M. catarrhalis</i> .	Mixed streptococci and <i>M. catarrhalis</i> .	Dr. G. L. Park, Federal Quarantine Station.	Course, one month. 50 milli. to 250 milli. at weekly intervals. Dose increased if no rise of temperature or headache developed.	Improved	Tub. bac. present. Feeling of well-being following injection and slightly better appetite. No alteration in weight or cough.
16/6584	Pulmonary tuberculosis with mixed infection.	Sputum	Streptococci and staphylococci.	Mixed streptococci and staphylococci.	Dr. G. L. Park, Federal Quarantine Station.	Course, five weeks, discharged after that period. 50 milli. worked up by increases of 50 milli. to 250 milli. Doses given weekly and increased if temperature remained under 99.4 degrees after previous injection.	Unaffected	Tub. bac. present. Free diet, open air life.
16/6584	Pulmonary tuberculosis with mixed infection.	Sputum	Streptococci, staphylococci, and <i>M. catarrhalis</i> .	Mixed streptococci, staphylococci, and <i>M. catarrhalis</i> .	Dr. G. L. Park, Federal Quarantine Station.	Course, one month. 50 milli. to 250 milli. at weekly intervals. Dose increased if no rise of temperature or headache developed.	Unaffected	Tub. bac. present.
13/6088	Pulmonary tuberculosis	Sputum	Streptococci	Streptococci	Dr. Labor	Course, three months	Unaffected	Tub. bac. present. No other treatment except open air, rest, and good food.
13/145	Pulmonary tuberculosis with secondary infection.	Sputum	Streptococci	Streptococci	Dr. C. Purser	Course, four months	General improvement	Tub. bac. not detected (four occasions). Reacted to tuberculin. Cold cured.
16/4640	Slight tubercular infection (pulmonary).	Sputum	(a) <i>M. catarrhalis</i> , (b) pneumococci, (c) Coliform bacillus	(a) <i>M. catarrhalis</i> , (b) pneumococci, (c) Coliform bacillus	Dr. R. Bowman	Course, twelve months. For first six months a weekly dose of 375 milli. was given, last six months every twelve days. Still under treatment.	General improvement	Patient gained 7 lb. in the year. Sputum much decreased. Tonics, &c.
16/6723	Pulmonary tuberculosis	Sputum	Gram negative bacilli and streptococci.	Gram negative bacilli and streptococci.	Dr. R. Bowman	Course, twelve months. For first six months a weekly dose of 375 milli. was given, last six months every twelve days. Still under treatment.	General improvement	Patient gained 7 lb. in the year. Sputum much decreased. Tonics, &c.

DIVISION IV.—Parasites.

9. HYDATIDS (ECHINOCOCCI).

(J. B. CLELAND).

During the year, of eleven specimens submitted from human beings six yielded negative evidence as regards the presence of *Echinococci* and five gave positive results. Of the negative cases three consisted of sputa; two consisted of materials coughed up. In one of these latter cases the material was thought to be a tea-leaf, and proved to be such, this opinion being confirmed by Mr. Darnell Smith. This case was interesting as the patient was a nurse, who, whilst drinking the last mouthful of her cup of tea, choked and felt "smothery" and became very blue, and since then had had a cough. This increased and her temperature rose, and she coughed up purulent expectoration in which was eventually found a small brown fragment. After coughing up the foreign body she gradually improved and eventually became quite well again. In the other case the material which was supposed to have been coughed up showed the presence of small globular white bodies, about the size of millet grains, in a web-like structure. This turned out to be material from a spider's web containing the ovo-sac of some spider, this determination being confirmed by the Australian Museum. Dr. J. MacPherson, giving us clinical details of this case, says:—"How the spider's cocoon became mixed with her sputum remains to this day a mystery. I have known her for many years and I know that she would not deliberately be guilty of imposture. Further, she is most anxious to help in any way to get well and not to remain ill or be a 'mysterious' case. She has been seen by many physicians, all of whom, including myself, were certain that the condition was tubercular. She was twice an in-patient at the Royal Prince Alfred Hospital, where no tubercle bacilli were found, nor did an X-ray examination reveal any tubercular changes. Hydatid was also excluded. Large numbers of pneumococci were found in her sputum, and a vaccine was prepared from these with which she was regularly treated, receiving up to 700 millions at one injection. Nothing, however, has done her any good and the cough continues and the emaciation progresses." It can hardly be considered that the spider's web and ovo-sac were really expectorated by the patient after a lengthy sojourn in the lung. The appearance of the material was against this, and presumably some fallacy of which the patient was unaware has entered into the submission of the specimen. The other case which was negative consisted merely of fluid from a knee-joint.

Of the five cases which were positive, one consisted of sputum brought up during a fit of coughing. The patient was in the Coast Hospital and gave a history of hæmoptysis. An examination of the chest revealed nothing very definite. Laminated hydatid membrane was found in the specimen.

In the second case, old laminated hydatid membrane covered with small colourless crystals either phosphates or carbonates, was passed in the fæces of the patient at Lockhart. She had had acute abdominal pain and jaundice.

In another case, a woman confined in the State Penitentiary, a greenish-tinted cyst the size of an olive, showing microscopically laminated membrane, brood capsules and hooklets, was passed in the fæces. This was preceded by "terrible agony," the pain being in the region of the gall bladder and extending straight through to the back. The patient said that quite a number of little bodies like small eggs had been passed, and that this was the third attack of a similar nature that she had had. Microscopically branched fungal hyphæ were also found on the surface of the membrane.

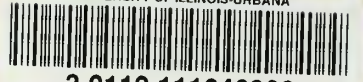
In a patient from Wellington a laminated hydatid membrane was passed in the urine.

The fifth case came from Maitland, and showed typical laminated membrane in pass, the site of the material not being stated.

[5 diagrams, 29 charts, 2 plates, 4 photos.]

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